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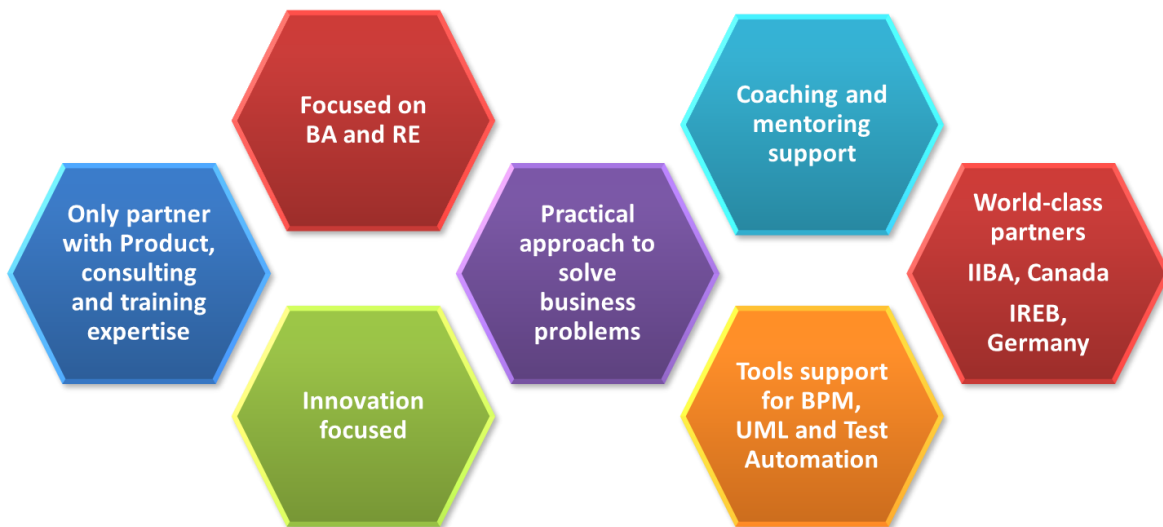


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|---|-----------------------------------|-------------|-------------------|--------------|----------|----------|----------|----------|----------|
| 1 | Peter Johnson | 03 Nov 2018 | 9.00 to 13.30 ET | | | | | | |
| 2 | | 04 Nov 2018 | 09.00 to 13.30 ET | | | | | | |

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 ☐ Techniques
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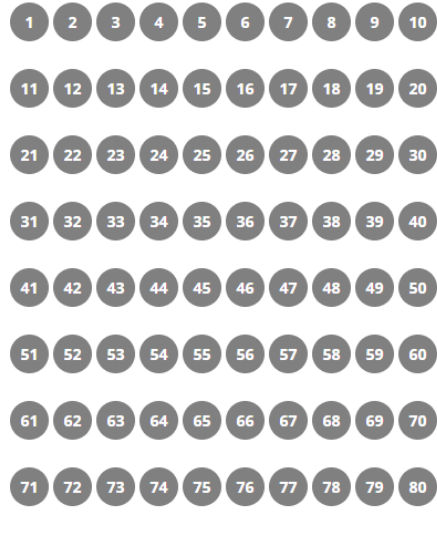
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Organization A provides weightages - Must have get 10 points; discretionary items are given points ranging from one through nine. Vendor proposals are ranked against the criteria list. The vendor with the most points is selected. The techniques that are used for this process are

- ☒ Vendor assessment, decision analysis, and key performance indicators.
- ☒ Vendor assessment, key performance indicators, and acceptance/evaluation criteria definition.
- ☒ Decision analysis, structured walkthrough, and functional decomposition.
- ☒ Create a business domain model and schedule a walkthrough or review.

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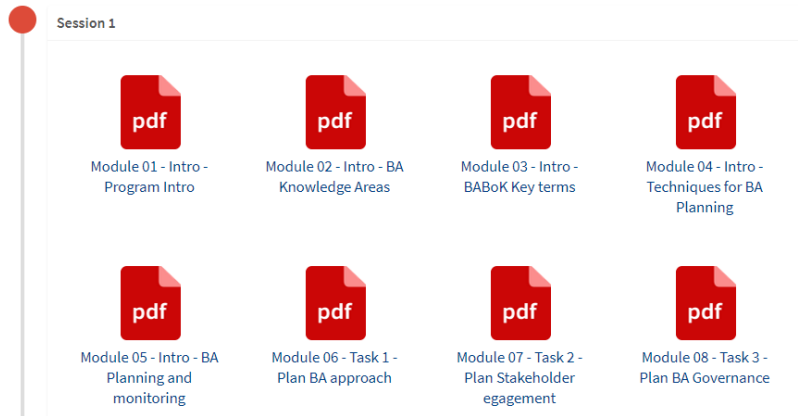
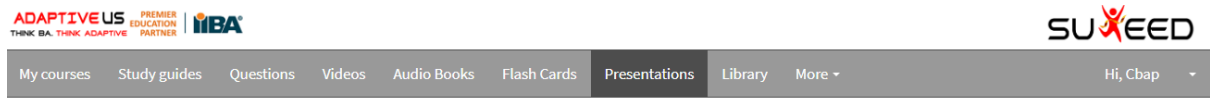
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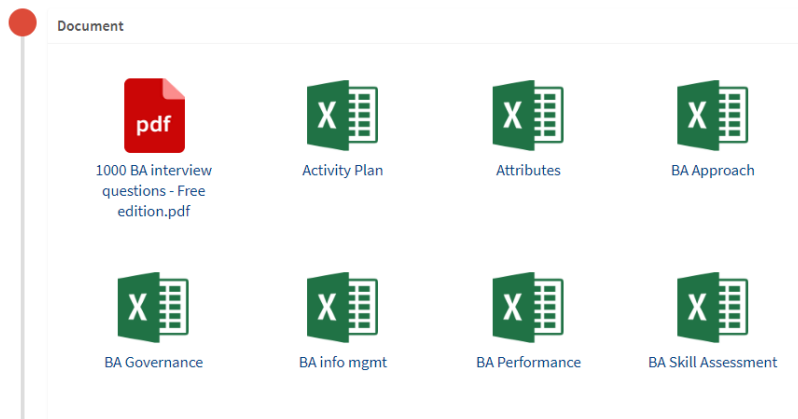
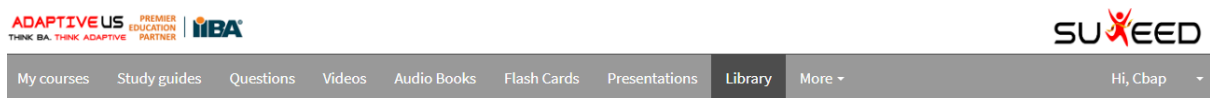


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1. Introduction

1. 1. Why this book?

As a training and consulting organization for business analysis, we have come across many techniques that business analysts use while conducting business analysis activities. We decided to compile all the techniques that we came across and find useful.

This can serve as a good guidebook for both new and experienced business analysts.

If you come across any new technique that you find useful during business analysis, do write to us. We will include the same in our book.

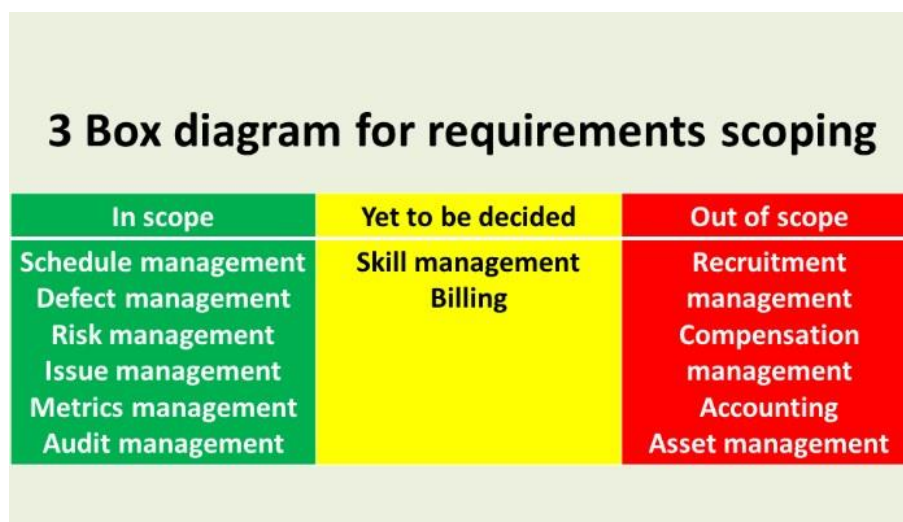
1. 2. **Other sources of Business Analysis information**

1. A Guide to Business Analysis Body of Knowledge v3.0.
International Institute of Business Analysis.
2. Project Management Institute, Project Business Analysis Guide.
3. Business Analysis, Debra and Paul, BCS.
4. CMMI for Development, Carnegie Mellon University.
5. ISO 9001:2008 from ISO.
6. System Engineering Body of Knowledge, IEEE.
7. Enterprise architecture (including Zachman Framework for Enterprise architecture™, and TOGAF™).
8. Governance, and Compliance Frameworks, including Sarbanes-Oxley, Basel II, and others.
9. IT Service Management (including ITIL).
10. Rupp, Klaus Pohl and Chris. A Study Guide for the Certified Professional for Business analysis Exam Foundation Level 2nd Edition. Rocky Nook Inc., 2015.
11. Podeswa, Howard. The Business Analyst's Handbook.
Boston: Course Technology, 2009.
12. UML for the IT Business Analyst, Second Edition. Boston:
Course Technology, 2010.
13. James Cadle, Debra Paul and Paul Turner. Business Analysis Techniques. Chippenham: British Informatics Society Limited, 2010.

2. **3 bucket technique for requirements scoping**

3 bucket technique is a very simple technique to put requirements into 3 buckets. The 3 buckets are:

1. Green bucket – Items in scope
2. Yellow bucket – Items about which it is not clear whether they are in scope or not
3. Red bucket – Items out of scope



Advantages

- ✓ Simple visual technique.

Disadvantages

- ✓ None.

3. **6356 technique**

6356 is a simple and structured brainstorming technique. In this technique, each participant is asked to generate 3 ideas every 5 minutes. The session is carried out for 30 minutes.

| Choose | Every | Each participant gives | Repeat this process for |
|--------------|---------|------------------------|-------------------------|
| 6 | 5 | 3 | 6 |
| Participants | Minutes | Ideas | times |

Advantages

- Generates 100+ ideas in just 30 minutes time.

Disadvantages

- None.

4. **Acceptance criteria**

Acceptance criteria describe minimal set of requirements to be met for a solution to be worth implementing.

Typically used when only one possible solution is being evaluated and expressed as pass or fail. Evaluation criteria are set of requirements used to choose between multiple solutions options, solutions or solution components. This allows for a range of possible scores.

Scoring is the process of determining how well a solution meets a requirement. Business analyst must establish a scale for scoring each requirement and define multiple possible scoring levels. Stakeholders must agree on the criteria, and how solutions will be rated against them. Ranking is the process of determining the order of importance for all requirements using MoSCoW technique. Acceptance and evaluation criteria must be testable.

Advantages

- Agile methodologies require requirements to be expressed as testable acceptance criteria.
- Necessary when requirements express contractual obligations.

Disadvantages

- May express contractual obligations, and difficult to change for legal or political reasons.

5. Active listening

Communication is very vital activity for BAs. Listening as a skill is extremely important for business analysis. Most often we hear, rather than listen. When we hear, we are not fully immersed in the conversation and tend to lose vital information being communicated from stakeholders. Active listening is listening with all senses.

Active listening involves:

1. Paying undivided attention to the speaker,
2. Suspending all judgment about what is being heard,

3. Asking questions when something is not clear without creating conflicts,
4. Paraphrasing back what is discussed,
5. Do a check on implicit requirements.

Advantages

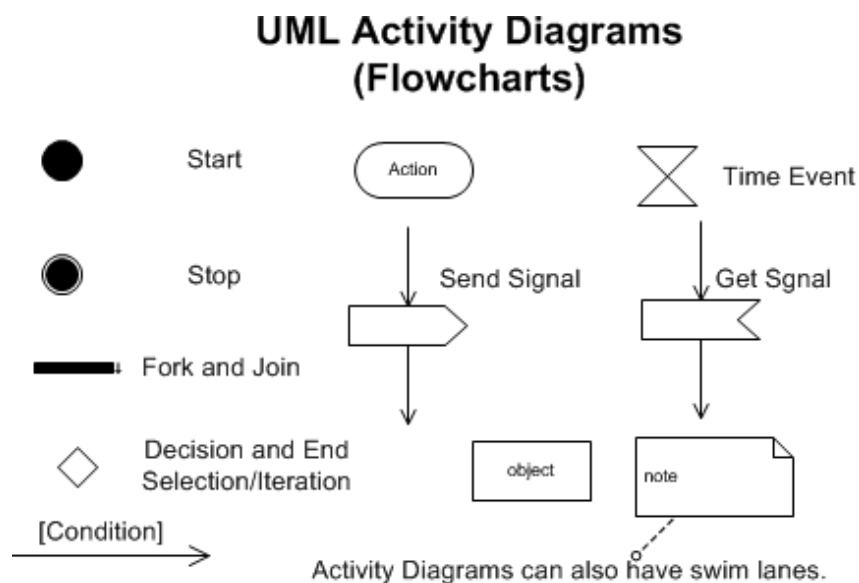
- Reduces communication gap significantly.

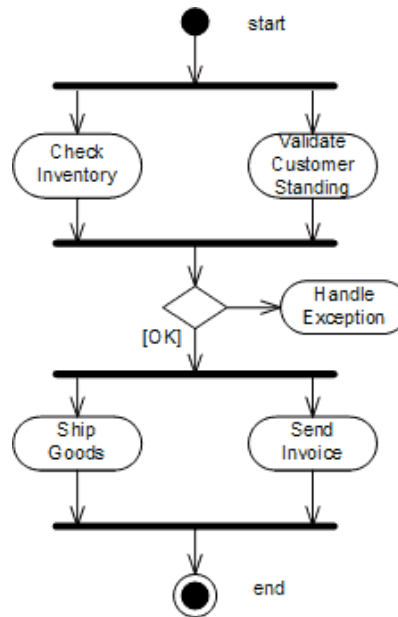
Dis-advantages

- None.

6. Activity diagrams

UML activity diagrams model action sequences.





Action nodes

Action nodes execute an action. Start nodes initiate execution of activity diagram. End nodes represent termination of activity diagram.

Control flows, object flows, responsibilities

Alternative control flows in activity diagrams are achieved through use of decision nodes. Synchronization bars depict concurrent execution of control flows.

Swim lanes are informal modeling where activities are placed along the lines of roles / actors responsible.

Advantages

- Provides clarity on actions carried out in a process.

Dis-advantages

- None.

7. Affinity diagram

Affinity diagrams cluster categories and subcategories of ideas that have an affinity to each other. Affinity diagrams are useful for generating common themes when faced with number of unorganized findings.



Advantages

- Helps to connect related issues of a problem or opportunity.
- Helps to understand root causes and possible solutions to problems.
- Helps in generating necessary capabilities to address a problem or opportunity.
- Prevents any one person from having undue influence on the outcome.

Disadvantages

- None.

8. Apprenticing

During apprenticing, business analysts collect requirements by becoming an apprentice in the stakeholder's work environment. This is useful for

- Documenting details about current processes.
- When the project's objective is to enhance or change a current process.

Steps for apprenticing

Prepare for apprentice

1. Determine activities to apprentice.
2. Identify a mentor for apprenticeship.

Learn

1. Learn safety aspects
2. Learn the process.

Be the apprentice

1. Execute tasks under mentor's guidance.
2. Record requirements.

Review requirements

1. Provide a summary of notes to the stakeholders, as soon as possible, for review, and any clarifications.
2. Review findings to validate requirements.

Advantages

- Provides realistic, and practical insight into business processes.
- Elicits details of informal communication.

- Identify workarounds which may not be documented.

Disadvantages

- Possible for existing processes only.
- Time-consuming.

9. Audio and video recordings

Audio and video recordings are helpful to preserve discussions for future reference. Take approval of stakeholders prior to recording the discussions. Many internet-based screen sharing software allow recording of the discussions.

Advantages

- Helps in reviewing requirements in future.

Disadvantages

- Needs additional resources.
- Some stakeholders may not like the discussions to be recorded.

10. Baselining

A baseline is a set of approved configuration items at a specific period of times. Configuration items within a baseline are not modified further without a change in their version numbers.

Baselines are hence read only copies for the team.

Advantages

- Helps to ensure build stable versions of the solution.

Disadvantages

- None.

11. Bionics

In bionics, problems faced are mapped to an analogous situation occurring in nature or some other domain.

Solution available in nature or other domain are understood and then it is applied to the project.

A good example of this approach is the SONAR system which was developed following the approach of bats being able to sense objects during night.

Advantages

- Complex problems or difficult-to-picture relationships may become manageable through analogies,
- Changing the context helps tear down inhibitions,
- Experiences and solutions from other contexts can be used,
- Useful to find unsuspected, creative solutions.

Disadvantages

- Needs lot of time, since one needs to build analogies first and then transform results back to original problem-space.
- Faulty transformations of the results produced can lead to unsuitable solutions.

12. Brainstorming

During brainstorming, one or group of stakeholders deliberate on an idea with the aim to produce numerous new ideas in a non-judgmental environment and derive themes for further analysis.

During brainstorming, ideas are collected within a certain time frame, usually in groups of 5 to 10 people.

Ideas are documented by a moderator without discussing, judging, or commenting on them at first.

Participants use ideas of other participants to develop new original ideas or to modify existing ideas. After that, collected ideas are subjected to a thorough analysis.

Brainstorming is especially effective when a large number of people of different stakeholder groups are involved.

Steps for Brainstorming

Prepare for brainstorming

- Develop a clear, and concise definition of the area of interest.
- Determine a time limit for the group to generate ideas; larger the group, allocate more time.
- Identify facilitator, and participants.
- Aim for 6 to 8 participants representing range of backgrounds, and experiences with the topic.
- Set expectations with participants, and get their buy

into the process.

- Establish criteria for evaluating, and rating ideas. **Conduct**

session

- Share new ideas without any discussion, criticism or evaluation.
- Visibly record all ideas.
- Encourage participants to be creative, share exaggerated ideas, and build on others' ideas.
- Don't limit the number of ideas as the goal is to elicit as many as possible within the time period.

Wrap-up

- On reaching time limit, discuss, and evaluate ideas using pre-determined evaluation criteria.
- Create a condensed list of ideas, combine ideas where appropriate, and eliminate duplicates.
- Rate the ideas.
- Distribute final list of ideas to appropriate parties.

Advantages

- Excellent ways to foster creative thinking as ideas are not judged.
- Facilitated properly, it can be fun, engaging and productive.
- Multiple people can expand on these ideas collaboratively
- Ability to elicit many ideas in a short time period.
- Useful during a workshop to reduce tension between participants.

- Unbiased collection of ideas allows new solutions to pop up.

Disadvantages

- Dependent on participants' creativity and willingness to participate.
- Organizational and interpersonal politics may limit participation.
- Group participants must agree to avoid debating the ideas raised during brainstorming.
- Effectiveness depends on the dynamics of the group and level of dominance of participants.

13. Brainstorming paradox

During brainstorming paradox, participants discuss about events that **MUST NOT** occur. This helps in developing measures to prevent the occurrences of undesired events.

Advantages

- Helps in early identification of risks and mitigations.
Advantages and disadvantages of this technique are identical to those of classic brainstorming.

Disadvantages

- None.

14. Brain-writing

During brain-writing, participants write down their ideas before discussing the same. Moderator collects the ideas and put them up for discussion.

Advantages

- Ideas are collected prior to being discussed. This avoids the problem of anyone dominating the discussion during brainstorming.

Disadvantages

- None.

15. Business rules analysis

A business rule is a specific, actionable, testable directive under control of an organization, and supports a business policy.

Rules should be independent of any implementation, they should not depend on any other information, nor should include assumptions about how they will be enforced.

Complex rules, or rules with a number of interrelated dependencies, can be expressed as a decision table or decision tree.

Business rules should be:

- Stated in appropriate terminology for Domain SMEs to

validate.

- Documented independently of enforcement.
- Stated at atomic level, and in declarative format.
- Maintained in a manner to monitor, and adapt the rules as the business policies change.

Operative rules

Operative rules guide actions of people, hence can be violated.

Determine sanctions to be imposed for violations; when a rule can be overridden (before or after the fact), or circumstances when an exception to a rule is appropriate. These may lead to definition of additional rules.

An example of an operative rule is: "No customer should be provided a credit period more than 30 days."

Structural rules

Structural rules categorize business information or define business formulas. As structural rules do not affect behavior of persons, they cannot be violated, but can be misapplied.

An example of a structural rule is "A customer with more than 50 million USD turnover is a large customer". An example of a formula "An order's local tax = (Sum of the prices of all the order's taxable ordered items) × local tax rate".

Advantages

- Allows organizations to make changes to policy without altering processes.
- Impact of changes to business rules can be assessed easily.

Disadvantages

- Can be lengthy, contradict one another or produce unanticipated results when combined.
- May be irrelevant to current, and future operations, and structure.

16. Business rules catalog

Business rules catalog captures business rules and related attributes in a tabular form. Business rules describe how to constrain or support a process behavior. They usually apply across processes.

Common attributes for a business rules catalog are:

1. Unique ID
2. Description,
3. Type in case there are multiple types,
4. References to other related documents.

Tips for writing business rules:

1. Must be correct.
2. Must be verifiable.
3. Must be consistent.
4. Must be current.

5. Write in simple language.
6. Each rule should describe one independent rule.
7. Should not be nested.
8. Should be maintained at organizational level, at least above project level.
9. Should be traced for implementation if needed in the project.

Advantages

- Ensures rules are maintained and implemented correctly.

Disadvantages

- Can become large list unless maintained properly.

17. Change of perspectives: 6 Thinking Hats

This technique was created by Edward de Bono in his book '6 Thinking Hats'. Most stakeholders have an inherent bias to consider everything from a single perspective. For example, stakeholders who are optimists, will expect things to go in the best way.

This results in the situation that they fail to consider negative viewpoints. They are likely underestimate resistance to plans, hence not making needed essential contingency plans. Similarly, pessimists may be excessively defensive. Emotional people fail to look at decisions

calmly and rationally.

Six thinking hats is used to look at decisions from a number of different perspectives. Each of the six hats represents a particular perspective that is adopted in turn by each of the participants.

This forces participants to move out of their habitual thinking style and helps them to get a more rounded view of a situation. The resulting solutions approach the problem from different standpoints. This way, even stakeholders that are very convinced of their own opinion are persuaded to adopt a different standpoint. Each 'Thinking Hat' is a different style of thinking. These are:

White Hat (Data / Logical):

Focus on the data available. Look at the information you have and see what you can learn from it. Look for gaps in your knowledge and either try to fill them or take account of them. This is where you analyze past trends and try to extrapolate from historical data.

Red Hat (Intuition):

'Wearing' the red hat, you look at problems using intuition, gut reaction and emotion. Also try to think how other people will react emotionally. Try to understand the responses of people who do not fully know your reasoning.

Black Hat (Devil's advocate):

Using black hat thinking, look at all the negative aspects

of the decision. Look at it cautiously and defensively. Try to see why it might not work. This is important because it highlights the weak points in a plan. It allows you to eliminate them, alter them, or prepare contingency plans to counter them. Black Hat thinking helps to make your plans 'tougher' and more resilient. It can also help you to spot fatal flaws and risks before you embark on a course of action. Black Hat thinking is one of the real benefits of this technique, as many successful people get so used to thinking positively that often they cannot see problems in advance. This leaves them under-prepared for difficulties.

Yellow Hat (Optimist):

Think positively. It is the optimistic viewpoint that helps you to see all the benefits of the decision and the value in it. Yellow Hat thinking helps you to keep going when everything looks gloomy and difficult.

Green Hat (Creative):

Develop creative solutions to a problem. It is a freewheeling way of thinking, in which there is little criticism of ideas. A whole range of creativity techniques can help you here.

Blue Hat (Process control):

Blue Hat stands for process control. This is the hat worn by people chairing meetings. When running into difficulties because ideas are running dry, they may direct activity into Green Hat thinking. When contingency plans are needed, they will ask for Black Hat thinking, etc. A variant of

this technique is to look at problems from the point of view of different professionals (e.g. doctors, architects, sales directors, etc.) or different customers.

Advantages

- Very useful in segregating requirements.
- Extraordinarily beneficial when stakeholders can only express their knowledge in a biased manner or are harshly constricted to their opinions.

Disadvantages

- Needs time.
- Cannot be applied for fine-grained requirements due to excessive effort.

18. Checklists

Checklists are simple yet powerful technique to ensure something has been looked into. Checklists should be short and ordered with right priorities.

Advantages

- Helps to ensure all necessary aspects are looked into.

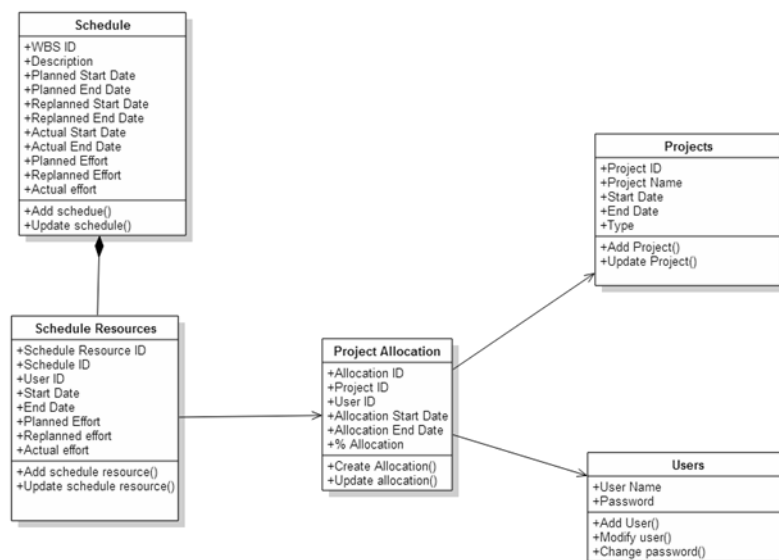
Disadvantages

- Usage of checklists still remain low in organizations due to time constraint and complexity.

19. Class model

Data perspectives describe structural data elements of any system. They are depicted in 2 models, Entity-relationship diagram (structured programming) and Class diagram (Object oriented programming).

In Object oriented programming, class diagrams of UML are used to model data perspective. A class diagram consists of a set of classes and associations between classes. Classes and associations in UML class diagrams are similar to entity types and relation types in entity-relationship diagrams. Class models have additional modeling elements (e.g., that allow for specification of valid operations on instances of a class) and thus have a greater power of description.



Classes

Classes are depicted by rectangles separated into sections (also called compartments). In upper sections, attributes

are described. In lower sections, all operations that can be performed on instances of class are listed, also known as methods.

Associations, multiplicities and roles

Associations between classes are depicted by connecting lines with arrow or diamond heads. Associations may be given a name. Multiplicities may be mentioned at each end of an association. Multiplicities are similar to multiplicities for Entity-Relation diagrams.

Aggregations and compositions

Aggregations and compositions describe a relationship between whole (Parent / Aggregation) and its parts. In composition a part cannot exist without its whole. In UML, an aggregation is depicted as an empty diamond and a composition is depicted as a filled diamond.

Generalizations

Generalizations between classes of UML are relationships between more specific classes (sub-types) and more general classes (super-types). Sub-type in a generalization relation inherits all properties of super-type and can adapt and/ or extend these.

Advantages

- Offer flexibility of descriptions at different levels.
- As data models have a strong basis in mathematical concepts, data models are supported by rigorous rules for correctness and completeness. This encourages

accuracy in development of systems.

Disadvantages

- Complex for people without a background in IT.
- Terms and definitions may vary in use in different organizational units or domains.

20. Commenting, aka informal review, expert opinion

In commenting, usually a co-worker, reviews documented requirements. She comments identified errors in the requirements document itself. Commenting is quick and requires no prior preparations. However, commenting may capture less errors as it is informal. Also requirements errors are not formally captured for further analysis.

Advantages

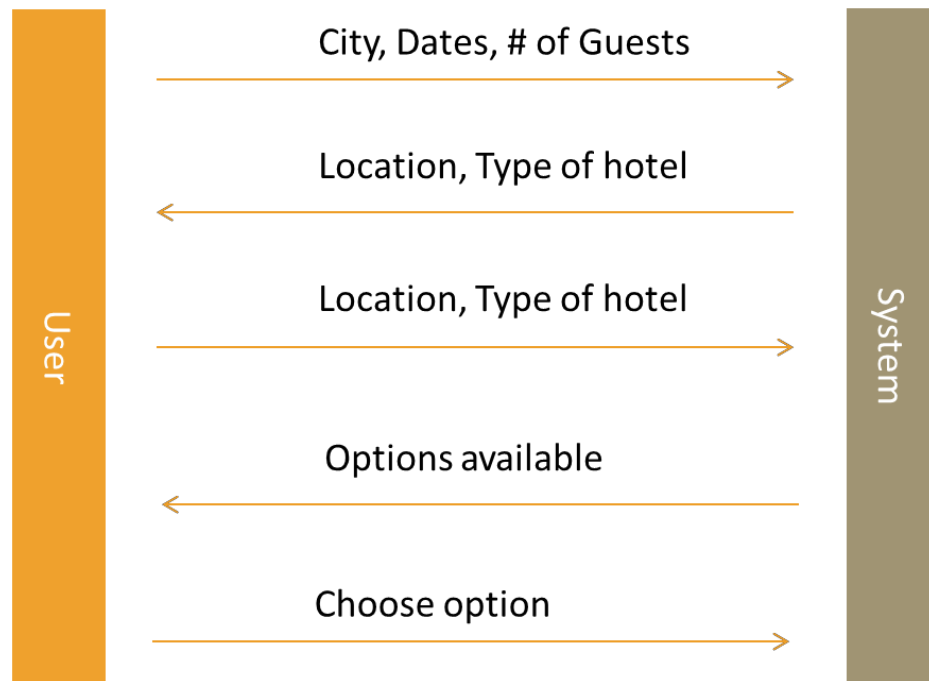
- Quick and takes less effort.

Disadvantages

- May not find all defects.

21. Communication model

Communication models indicate user – response sequences. It flows top down.



Advantages

- Helps to understand sequence of interactions between user and system and validate the same.

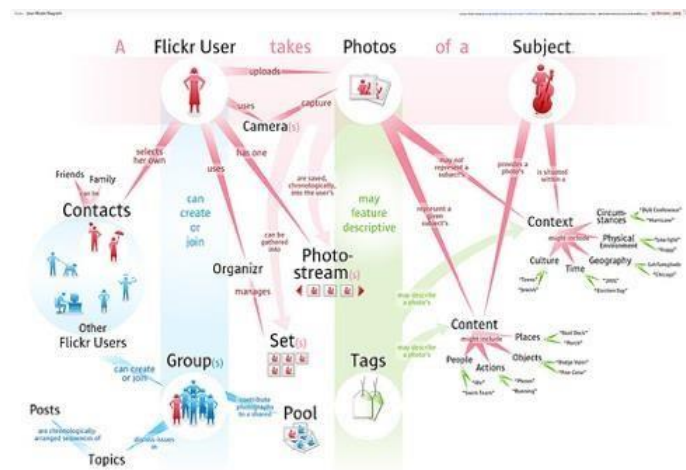
Disadvantages

- None.

22. Concept model

Data models describe concepts relevant to a domain in diagrammatic, and textual manner (types of people, places, things etc.), relationships between those concepts, and information associated with them. two most widely used types of data model are - Entity-relationship diagram (ERD), for relational database management systems (RDBMS), and Class diagram, for object-oriented (OO) development.

A concept is something of significance to the domain being described, about which the organization needs data. Each type of concept should have a unique identifier (a type of attribute) that differentiates between actual instances of the concept. Concepts are referred to as entities in ERDs, and as classes in class diagrams.



Advantages

- Helps to understand entities at a higher level but deeper level than package diagram.

Disadvantages

- At high level, need further detailing to be implemented.

23. Configuration management system (CMS)

Configuration management ensures that the product or service being developed conforms to its approved requirements. It provides a process to verify this conformance, document changes, and report the status of each change throughout the project life cycle.

CMS includes documentation, tracking, and approval levels necessary for authorizing changes.

It enables managing changes to aspects of a product, as well as the other products on which it depends or which depend upon it.

Advantages

- Maintain history of requirements changes, access to previous versions of documents is available, when needed.
- Ensures requirements and related documents, such as, models, traceability matrix, and issues list, are stored where they can be easily accessed by project stakeholders.
- Documents are safeguarded from loss.

Dis-advantages

- Without a proper technique, this can consume significant effort.

24. Conflict resolution

Conflicts arise during throughout business analysis activities.
Stakeholders provide contradicting requirements during elicitation.
Business analysts should pay attention to potential conflicts so that they can be identified, analyzed and resolved early.

Effective conflicts resolution is key to a project's successes. Conflict resolution strategies have significant effect on willingness of stakeholders involved to continue working along. Unfair conflict resolutions lead to decreased engagement and collaboration in the project.
Vice-versa is also true. Irrespective of conflict resolution strategies, Business analysts MUST involve all relevant stakeholders during conflict resolutions.

Agreement

Conflicting parties negotiate a solution to the conflict. They exchange information, arguments and opinions and try to convince one another of each other's viewpoints to achieve an agreeable solution.

Compromise

Conflicting parties compromise to a solution where each party is willing sacrifice certain aspects.

Voting

Conflict parties vote on solution alternatives and alternative with most votes is accepted as resolution for the conflict.

Definition of variants

System is developed in a way that permits different behaviors by use of variants (or parameters). For example, the system behaves differently for processes executed in country A vs. country B.

Overruling

Conflict is resolved by means of formal authority. Should be used only if other resolution techniques have failed or are not feasible due to resource limitations (e.g., time).

Consider-all-facts

Investigate all influencing factors of a conflict. Determine relevance by prioritizing influence factors. Based on results of this technique, apply Plus-Minus- Interesting technique.

Plus-Minus-Interesting

Investigate all positive and negative repercussions of a solution alternatives. Place positive repercussions are placed in category "Plus", negative repercussions in category "Minus" and rest as "Interesting". Choose solution with maximum pluses.

Decision matrix

Create a decision table that contains solution alternatives in columns and all relevant decision criteria in rows.

Identify decision criteria using technique "consider-all- facts". Assess each combination of criterion and solution alternative, for example by means of a point-scale ranging from irrelevant (0 points) to relevant (10 points).

Calculate sums of columns in order to find a solution.

Accept solution alternative with highest score.

Advantages

- Higher project success.

Dis-advantages

- None.

25. Context diagram

Context diagram shows all relevant systems, relationships between them, and optionally, data flows between them. It is made up of boxes representing the systems and lines between the boxes that depict the relationships. Labels on the lines identify the data being communicated and arrows indicate direction that the data flows.

Example below shows Context diagram for Adaptive:



Advantages

- Easy to understand.
- Good to get an overall view.

Disadvantages

- High level and needs further detailing for development.
- Does not show systems which are not directly impacting the system.

26. CRC Cards

A Class Responsibility Collaborator (CRC) model is a collection of standard index cards that have been divided into three sections, Class Name, Responsibilities and Collaborators.

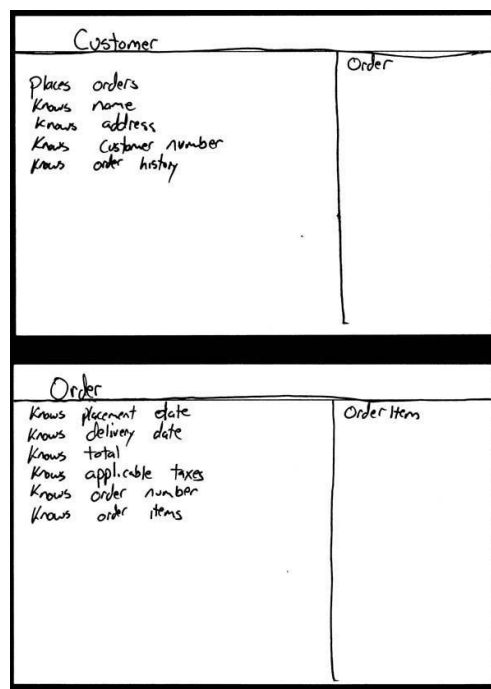


Image source: AgileModeling.com

Classes represent collection of similar objects (like person, place, thing, event, or concept that is relevant to the system at hand). For example, in a order management system, classes would represent orders, items, customers etc. Name of the class appears across the

top of a CRC card and is typically a singular noun or singular noun phrase.

Responsibilities are anything that a class knows or does. For example, orders have customers, items, quantities and prices. Orders are also paid, shipped, and delivered.

Sometimes a class has a responsibility to fulfill, but not have enough information to do it. For example, to pay for an order, customer must know items, prices and quantities. What the Customer class needs to do is collaborate/interact with the Order class to get the amount. Therefore, Order is included in the list of collaborators of Customer.

Advantages

- Simple way to understand concepts, their attributes and relationships.

Disadvantages

- Needs training to develop the models.

27. CRUD Matrix

CRUD stands for Create – Retrieve – Update and Delete. These 4 are fundamental operations on any data being managed by any system.

In most modern system, Delete is not used, instead, a variant of update called “Soft Delete” is used. In Soft delete, a column is updated to indicate that the record has been deleted and not shown in the user interface or reports. However, such records can be retrieved later on.

Advantages

- Ensures basic operations on data are implemented.

Disadvantages

- Most modern systems usually require more operations than just CRUD.

28. CURIE Matrix

CURIE matrix is an improvement over CRUD matrix. It stands for Create –Update – Retrieve - Import and Export. These 5 are fundamental operations on any data being managed by any system.

In most modern system, Hard Delete is mostly not used. Hard delete removes the data from the system which cannot be easily retrieved again, hence is not highly desirable.

Instead, a variant of update called “Soft Delete” is

used. In Soft delete, a column is updated to indicate that the record has been deleted and not shown in the user interface or reports. However, such records can be retrieved later on.

Import and export are also becoming a very desirable feature for data operations as data can be easily interfaced to other systems.

Advantages

- Ensures basic operations on data are implemented.

Disadvantages

- None.

29. Data dictionary and glossary

Data dictionaries include standard definitions of primitive data elements, their meanings, and allowable values, and indicate how those elements combine into composite data elements. A glossary documents terms unique to the domain.

Primitive data elements

Record following information about each data element in the data dictionary:

| | |
|---------|---|
| Name | A unique name for the data element. |
| Aliases | Alternate names for the data element. |
| Values | List of acceptable values for the data element. |

| | |
|-------------|---|
| Meanings | If the values are abbreviated, include an explanation of the meaning. |
| Description | Definition of the data element in the context of the solution. |

Composite data elements

Composite data is assembled from primitive data elements, for example an intelligent ID to describe items.

Composite structures include:

| | |
|------------------|---|
| Sequence | Show primitive data elements in specific order. |
| Repetition | Shows that one or more primitive data elements occur multiple times in the composite element. |
| Optional element | May or may not occur in a particular instance of the data element. |

Advantages

- ✓ Useful for ensuring all stakeholders are in agreement on format, and content of relevant information.
- ✓ Capturing these definitions in a single model ensures consistent usage.

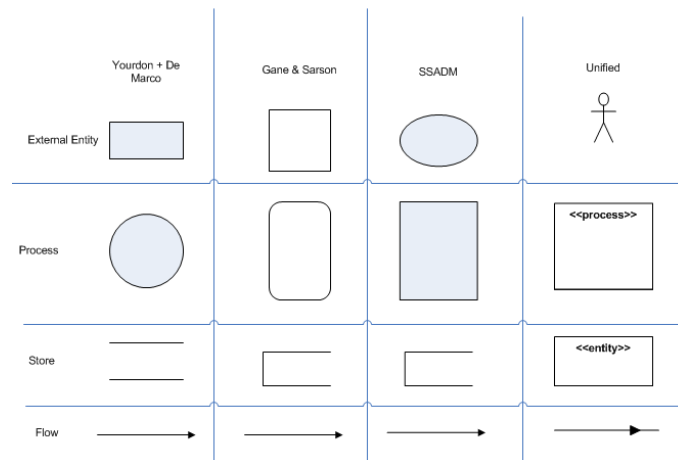
Disadvantages

- None.

30. Data flow diagrams

Data models show data flow, data processes, data stores, sources and sinks in system environment. Data flows can be modelled at different levels of abstraction. Important modeling elements of data flow diagrams in different

notations are below:



Data manipulation

A data process consumes input data, processes this data and outputs result of processing in form of output data. How data is transformed is not depicted in data flow diagrams. **Resting data /**

Data store

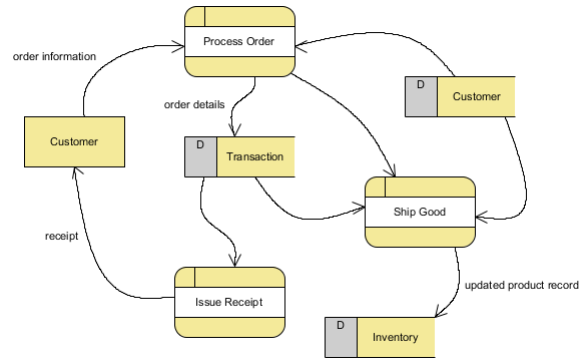
Data stores depict persistent data. Data processes access and may update data in a data store.

Sources and sinks in system environment

Sources provide data to system, while sinks receive data from system (like people, departments, organizations, or other systems). These cannot be altered during system development.

Flowing data

A data flow describes data that is transported between processes, data stores and sources/ sinks.



Advantages

- Easy for stakeholders to understand.

Disadvantages

- None.

31. Data model

Data models describe concepts relevant to a domain in diagrammatic, and textual manner (types of people, places, things etc.), relationships between those concepts, and information associated with them. two most widely used types of data model are - Entity-relationship diagram (ERD), for relational database management systems (RDBMS), and Class diagram, for object-oriented (OO) development.

Data models are often supported by Data dictionary, Glossary, and Business rules analysis.

A concept is something of significance to the domain being described, about which the organization needs data. Each type of concept should have a unique identifier (a type of attribute) that differentiates between actual instances of the concept. Concepts are referred to as entities in ERDs, and as classes in class diagrams.

An attribute defines a particular piece of information associated with a concept— What information can be captured in it, allowable values, and the type of information.

Logical data models describe the information relevant to an organization.

High-level logical data models may focus solely on describing the entities, attributes, and relationships of most importance.

Detailed logical data models communicate comprehensive descriptions of all entities, attributes, and relationships.

Physical data models describe how data is stored, and managed in a software application.

Relationships are significant business associations between concepts. Relationships define how information is used in the operation of the business, and indicate the important linkages that need to be managed, and maintained in the solution. Relationships may also indicate the “cardinality” or “multiplicity” of the relationship (i.e. the number of relationships allowed or required).

Metadata is “data about data”. Metadata describes the context, use, and validity of business information, and is

generally used to determine when, and why.

Advantages

- Data models offer flexibility of different levels of description. They provide a consistent modeling approach that supports the transition through planning, analysis, design, and implementation.
- As data models have a strong basis in mathematical concepts, data models are supported by rigorous rules for correctness, and completeness. This encourages accuracy in development of models.

Disadvantages

- Complex for people without a background in IT.
- Terms, and definitions may vary in use in different organizational units or domains.

32. Deep structure discovery

Natural languages suffer from known ambiguity issues. Business analysts can exploit this to elicit **deep structures** (i.e., what requirement providers really meant) from its **surface structures** (i.e., stated requirements).5 most common **transformational processes** for requirements are:



Users tend to convert a long-lasting activity or group of nouns

into a single event or noun, This is nominalization. For example, users may say “Manage schedule” when what they actually mean is “Create, Retrieve, Update, Delete, Import and Export schedule”.

The way to minimize nominalization is to identify all verbs used in requirements. These verbs **MUST** be explained clearly in glossary and agreed upon by all stakeholders.

Nouns without reference index

Users tend to omit adverbs or use generic nouns. Common nouns which are incompletely specified are: user, system, message, data, or function.

For example, let us study a requirement “Users shall update data using their devices”. The following questions arise: Which user? What data? Which devices?

We can write the above requirements as: Privileged users can update schedule data using their laptops or mobile phones.

Universal quantifiers

Universal quantifiers group set of objects and generalize behavior or property for the group. Typical universal quantifiers are: All, always, every, never, no, none, or nothing etc. Most likely the specified behavior or property may not apply to all the objects in the specified group.

Business analysts **MUST** verify whether specified behavior or property really applies to all objects grouped through quantifiers.

For example, let us consider a requirement "The system shall not allow anyone to delete projects". In this case, following question must be asked: "Can no employee actually delete the name? What happens if someone created a project by mistake?"

Incompletely specified conditions

Conditions are usually associated with words such as if... then, in case, whether and depending on. Stakeholders sometimes specify behavior that **MUST** occur when condition is met, but forget to specify what should occur if condition is NOT met.

For example, let's consider requirement, "Only post graduates are eligible to attend the program". In this example, at least one aspect remains unspecified: "Which programs shall be offered to graduates or lower"?

Business analysts should use decision tables and decision trees for complex conditional structures.

Incompletely specified process verbs

Some verbs need more than one noun to be completely specified. For example, verb "Communicate" requires at least three aspects for completeness: "What is being Communicated, Who is communicating and to whom it is being Communicated". Formulating requirements in active voice minimizes incompletely specified process words.

Advantages

- Helps to make requirements specific and complete.

Disadvantages

- None.

33. Delphi

During Delphi technique, facilitator tries to reach consensus on a subject from experts. Facilitator uses a questionnaire to elicit ideas about the important points related to the subject. Experts provide inputs anonymously.

Facilitator summarizes responses and then recirculates to the experts for further comments. Facilitator tries to reach consensus through multiple rounds.

Advantages

- Helps to reduce bias in the data
- Prevents any one person from having undue influence on the outcome.

Disadvantages

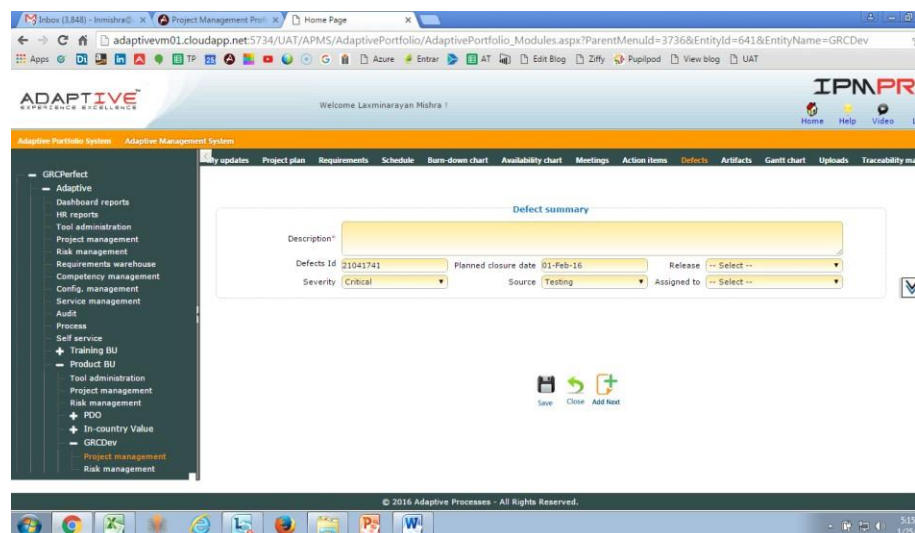
- Time consuming.

34. Display action response

Display-Action-Response model describes display perspective and behavior of each of the elements of wireframes. A table is created for each user interface (UI) element describing:

- UI element's display requirements under different preconditions,
- Behavior requirements under different preconditions and user actions.

User experience analysts, human factors experts and BAs work together for the same.



DAR for Defect description

| | | |
|--------------|-------------------------------|--------------|
| ID | AddDefect | |
| Description | A field for the user to enter | |
| Precondition | Display | |
| Precondition | Action | Response |
| Display | Enter | Text appears |

Advantages

- ✓ Precise and exact details for display and interactions in a user interface.

Dis-advantages

- Time consuming

35. Document analysis

Document analysis elicits requirements by studying available documentation on existing, and comparable solutions (business plans, market studies, contracts, requests for proposals (RFPs), statements of works (SoWs), memos, existing guidelines, procedures, training guides, competing product literatures, published comparative product reviews, problem reports, customer suggestion logs, and existing system specifications etc.). Document analysis gathers details of existing solutions, including business rules, entities, and attributes to be included in a new solution or need to be updated for the current solution.

Advantages

- ✓ Not starting from a blank page.
- ✓ Improved requirements coverage, assuming the documentation is up to date.
- ✓ Leveraging existing materials to discover, and/or confirm requirements.
- ✓ Cross-check requirements elicited from other techniques such as interviews, surveys or focus groups.
- ✓ Helpful when Domain SMEs are not available.

Disadvantages

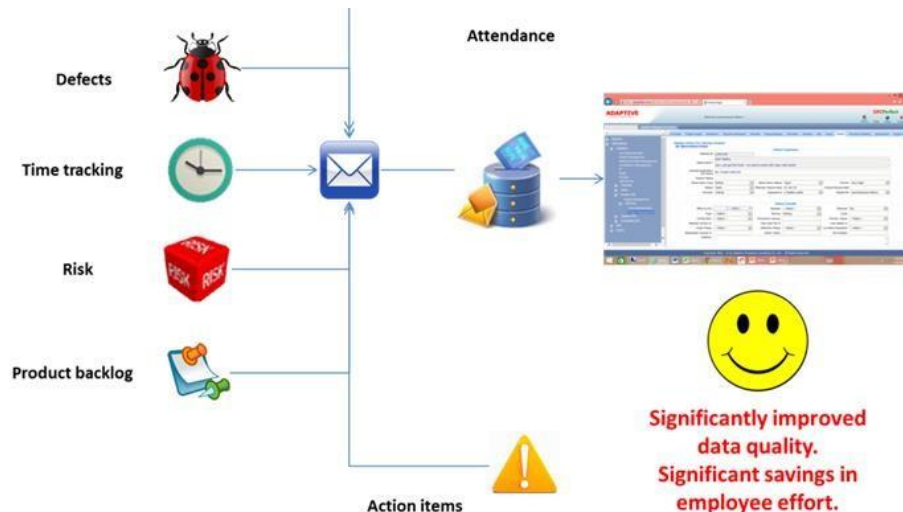
- Limited to "as-is" perspective.
- Existing documentation may not be up-to-date or valid.
- Can be time-consuming, and tedious process to locate relevant information.

36. Email listeners

Many data collection systems fail to achieve their purpose. The primary reason for the same is users find it time consuming to add data. Other aspects for poor data collection are:

- Considered as additional work beyond project works
- It takes too long to add any data.
- Users are not trained to use the system.
- Users are not able to access the system due to security issues.

Email listeners are services which read user emails and enter data into the applications.



Advantages

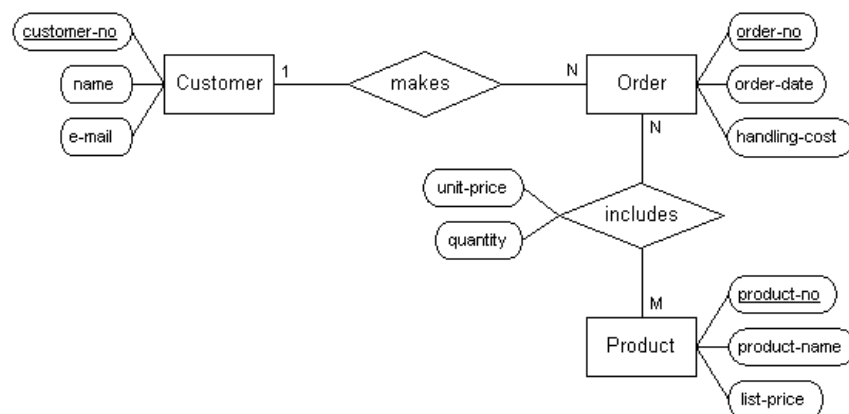
- Helps to prevent undesired actions.

Disadvantages

- None.

37. Entity relationship diagram

In structured programming, entity-relationship diagrams are used for modeling data perspective using entity types and relation types. Entity types define a set of entities, i.e. objects with same properties, such as people or items.



Advantages

- Offer flexibility of descriptions at different levels.
- As data models have a strong basis in mathematical concepts, data models are supported by rigorous rules for correctness and completeness. This encourages accuracy in development of systems.

Disadvantages

- Complex for people without a background in IT.

38. Estimation techniques

Estimation techniques used for better understanding of possible range of costs, and effort associated with any initiative. Estimation techniques are used when it is impossible to determine exact costs. Note that estimation techniques do not eliminate uncertainty, rather help to get a reasonable assessment of likely costs or effort required.

Different techniques of estimation

1. Analogous Estimation

Analogous estimate uses estimates of similar project for developing estimates for current project, also known a rough order of magnitude (ROM) estimate, and also known as "top-down" estimating and done usually in beginning or during project phase.

2. Parametric estimates

Analogous estimate uses a parameter to estimate. For example, if one has historical data available, which

indicates it takes 24 hours to develop one use case, one can estimate that it will take 480 hours for developing 20 use cases.

3. Bottom-up Estimation

Bottom-up estimation uses WBS technique to estimate deliverables, activities, tasks, and estimates from all the involved stakeholders, and rolls them up to get a total for all the activities, and tasks. Because it is normally easier to estimate smaller items than larger items, bottom-up estimating can produce the most accurate, and defensible estimates.

4. Rolling Wave

Rolling wave technique involves continual refinement of estimates. Estimate the details for activities in the current iteration or increment, and provide an analogous estimate for the entire scope of work. As the end of the iteration approaches, estimates for the next iteration can be made, and the initial estimate for all activities is refined.

5. Three-point Estimation

Uses scenarios for:

1. The most optimistic estimate, or best-case scenario.
2. The most pessimistic estimate, or worst-case scenario.
3. The most likely estimate.

Note that the most likely estimate is not an average of best, and worst case scenarios. It requires in depth knowledge of the situation.

Under the right circumstances, the best- case scenario may also be the most likely.

6. **Historic Analysis**

Historic analysis uses history as a basis for estimating. It is similar to analogous estimation but is used not only for the top-down estimate, but for the detailed tasks as well. Historic estimates require prior project records, whether maintained formally in a project repository or informally in individual project documentation.

7. **Expert Judgments**

Estimating relies on the expertise of those who have performed the work in the past. These experts can be internal or external to the project team or to the organization.

8. **Delphi Estimation**

This technique uses a combination of expert judgment, and history. There are several variations on this process, but they all include individual estimates, sharing the estimates with experts, and having several rounds until consensus is reached. An average of the three estimates is used. Sometimes the average is weighted by taking the optimistic, pessimistic, and four

times the most likely, dividing by six to get the average.

Advantages

- ✓ Estimates can help stakeholders make better decisions based on an improved understanding of the likely outcomes from an initiative.

Disadvantages

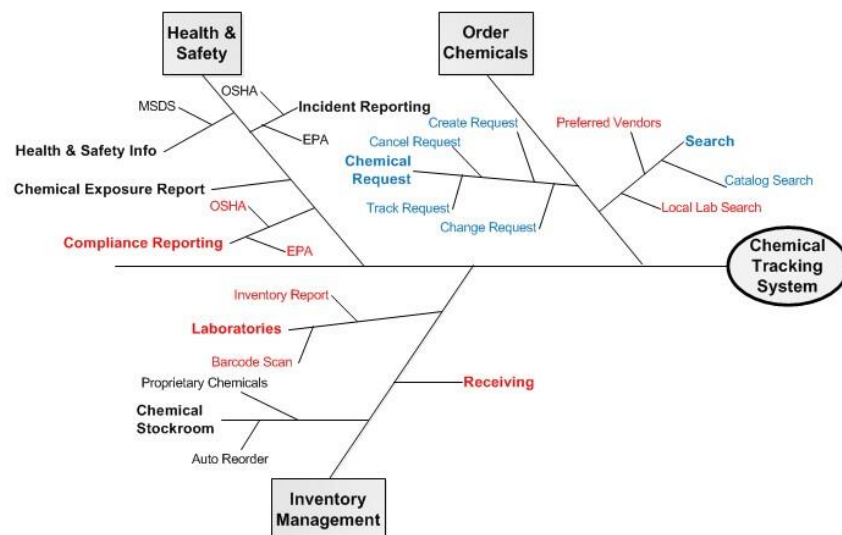
- Stakeholders treat estimates as commitments, and expect that the solution team will meet the time, and cost estimate.
- Often consciously or unconsciously altered to match the desires of influential stakeholders.

39. Feature model / Feature tree

Feature models are visual representation of all of the features of a solution arranged in a tree or hierarchical (horizontal or vertical) structure. A feature is a group of related requirements.

Most projects have features at varying levels; the top- level features are called Level 1 (L1) features, followed by Level 2 (L2) features, Level 3 (L3) features and so on.

Most feature models have three or fewer levels of features.



Advantages

- Helpful to show how features are grouped together
- Shows features are sub-features of other ones.
- Can show up to 200 features across different levels on a single page.

Disadvantages

- High level view – need further detailing for implementation.

40. Focus groups

Focus groups elicit ideas and attitudes from pre-qualified individuals about a specific product, service or opportunity in an interactive group environment.

Participants share their impressions, preferences and needs, guided by a moderator. Focus groups are typically 1 to 2 hours in length.

Focus groups can be utilized during any life-cycle state: exploratory, under development, ready to launch, or in production. For a product under development, focus group's ideas are analyzed in relationship to the stated requirements. This may result in updating existing requirements or uncovering new requirements.

For a to be launched ready product, focus group may influence how to position the product in the market. For a product in production, focus group may provide direction on the revisions to the next release of requirements.

Focus groups may also serve as a means to assess customer satisfaction with a product or service. Observers may record or monitor the focus group but should not participate.

Being a qualitative research,

focus group results are analyzed and reported as themes and perspectives, rather than numerical findings I include selected quotations to support the themes.

Traditional focus groups gathered in the same physical room. Now online focus groups allow members to be located remotely.

Focus groups are similar to a brainstorming sessions.

Differences are

- Focus groups are typically more structured and mandate a moderator.
- Brainstorming session's goal is to actively seek broad, creative, even exaggerated ideas.

Steps for focus group

Recruit participants

A focus group typically has 6-12 attendees. Invite additional individuals to allow for non-attendance due to scheduling conflicts, emergencies or for other reasons. If many people need to participate, run more focus groups. Topic of the focus group influences who should be recruited. If the topic is a new product, existing users (experts and novices) should be included. Consider pros and cons when using homogeneous vs. heterogeneous groups.

Homogeneous – Individuals with similar characteristics.

Caution: Differing perspectives will not be shared.

Possible solution: Conduct separate sessions for

different homogeneous groups to collect differing perspectives.

Heterogeneous – Individuals with diverse backgrounds and/or perspectives. Caution: Individuals may self- censor if not comfortable with others' backgrounds or opinions, resulting in lower data quality.

Assign moderator and recorder

Moderator should be experienced in facilitating groups.

Typical skills include ability to:

- Promote discussion.
- Ask open questions - requiring or promoting an extended response.
- Facilitate interactions between group members.
- Engage all members.
- Keep session focused.
- Remain neutral.
- Be adaptable and flexible.

Create discussion guide - Include goals/objectives of the session and five to six open questions.

Reserve site and services - Select location for the session and arrange for transcription support, audio/video taping equipment, if needed.

Run focus group session

Follow a pre-planned script of specific issues and ensure the focus group objectives are met. However, the discussion should appear free-flowing and relatively unstructured for participants.

Produce report

Moderator analyzes and documents participants' agreements and disagreements and synthesizes them into themes.

Advantages

- Saves time and cost compared to conducting multiple individual interviews.
- Effective for learning people's attitudes, experiences and desires.
- Active discussion and ability to ask questions create an environment where participants can consider their personal views wrt others' perspectives.

Disadvantages

- In a group setting, participants may be concerned about issues of trust, or may be unwilling to discuss sensitive or personal topics.
- Data collected (what people say) may not be consistent with how they actually behave.
- Homogeneous groups may not represent complete set of requirements.
- Skilled moderator is needed to manage group

interactions and discussions.

- Difficult to schedule.
- Not an effective way to evaluate usability.

41. Functional decomposition

Functional decomposition breaks down a large aspect (processes, functional areas, deliverables, scope, or problems) into smaller aspects, as independent as possible, so that work can be assigned to different groups.

Functional decomposition provides ability to scale, and manage larger projects. Functional decomposition can be represented by a hierarchical diagram, a tree diagram, or by numbering each sub-aspect. Each aspect is wholly comprised of the sub-aspects beneath it.

Work breakdown structure (WBS) decomposes project scope in phases, work packages, and deliverables.

Advantages

- ✓ Creates a conceptual model of the work that needs to be completed.
- ✓ Provides all stakeholders with a consistent view of the scope of the effort.
- ✓ Assists in estimating.

Disadvantages

- No way to be certain that all components have been

captured.

- Decomposing without fully understanding the relationship between pieces creates an inappropriate structure.

42. Functional requirements analysis

Functional requirements (FRs) describe abilities of a system that are important to user community, such as functionalities offered by the system. Examples of functional requirements would be to manage customers, manage inventory, manage orders etc. Categories of functional requirements are:

User interface perspective: (UI)

In the UI perspective, an user interface perspective on the requirements of the system is adopted. For example, the method of data inputs and outputs from the system are documented.

Data perspective: (Data)

In the data perspective, a static-structural perspective on the requirements of the system is adopted. For example, the structure of input and output data as well as static-structural aspects of usage and dependency relations of the system and the system context can be documented (e.g., the services of an external system).

Functional perspective: (Logic)

The functional perspective documents which information (data) is received from the system context and manipulated by the system or one of its functions. This perspective also documents which data flows back into the system context. The order in which functions processing the input data are executed is also documented.

Behavioral perspective: (State)

In the behavioral perspective, information about the system and how it is embedded into the system context is documented in a state-oriented manner. This is done by documenting the reactions of the system upon events in the system context, the conditions that warrant a state transition, and the effects that the system shall have on its environment (e.g., effects of the system analyzed that represent events in the system context of a different system).

Advantages

- ✓ Strong influence on system's acceptance by users.

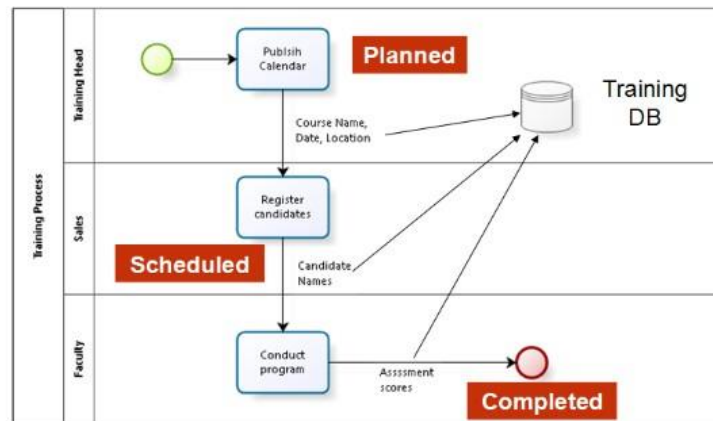
Disadvantages

- Many FRs added by users may be used sparingly.
- Un-controlled FRs significantly increase cost of development.

43. Fusion model

Fusion model combines activity diagram, data flow diagram and state chart diagram.

Fusion Model - The 3 in 1 Model



Advantages

- Reduces effort on developing 3 models
- Developers do not have to look at 3 different diagrams while developing the solution.

Disadvantages

- Not an industry standard.

44. Goal Modeling

Goals describe intentions of stakeholders. Goals are often described as features and business rules of systems to be developed.

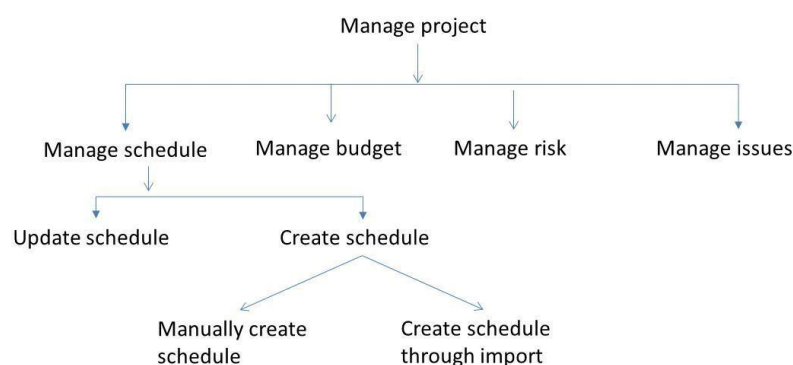
For example, the goals for a GRC system can be:

1. Ability to manage projects
2. Ability to manage risks
3. Ability to manage compliances.

Goals can be expressed in natural languages (as described above) or can be described using diagrams (models). Goals can be refined, i.e. de-composed from high level to low level. Goals can be documented using natural language or using goal models.

A widely used goal modeling technique is "AND/ OR" trees. By means of AND/ OR trees, business analysts can document hierarchical decompositions. Decomposition is depicted by graphic representations of branches. Direction of goal decomposition is top-down. Using AND/ OR trees, two types of decomposition relationships can be distinguished.

Figure below shows these types of decomposition as well as their modeling elements.



In AND-decomposition, every sub-goal MUST be fulfilled so that super-goal is fulfilled. This is represented by vertical lines. In OR-decomposition, it suffices if at

This is represented by angular lines.

Figure above shows an AND/ OR tree that documents hierarchical decomposition of goal "Manage the project". As goal model in above figure shows, goal "Manage the project" is refined into four sub-goals "Manage Schedule", "Manage Budget", "Manage Risks" and "Manage Issues".

"Manage Schedule" is further divided into 2 AND goals, "Create Schedule" and "Update Schedule". However, "Create Schedule" has two sub-goals which are OR type, that means, schedules can be created manually or through import.

Advantages

- Expresses goals in a visual manner.

Disadvantages

- Not an industry standard.

45. Impact analysis

Impact analysis evaluates proposed change as to how it will affect other requirements, the product, the project, and the program.

It includes identifying the risks associated to the change, the work required to incorporate the change, and the schedule and cost implications.

It tends to be formal in predictive life cycle (waterfall) projects. Projects using adaptive life cycles use an informal approach to assess impacts and devise a course of action based on the value of the change along with its impacts.

Impact analysis does the following at a minimum:

2. Assess impact on the requirements baseline. Using the traceability matrix, BAs can identify requirements impacted by the change, roughly quantifying how complex the change may be.
3. Assess impact if a proposed change conflicts with other requirements. Look for situations where requirements could be in conflict with one another. When implemented, a new requirement that is in conflict will cause another requirement or solution to break or not be implementable. Follow conflict management principles when such conflicts arise.
4. Assess impact on business analysis deliverables and work
5. Impact on project management and project deliverables

Advantages

- Allows for changes within the project to be considered in an integrated fashion, thereby reducing project and product risk.

Disadvantages

- Without a proper technique, this can consume significant effort.

46. Implicit requirements analysis

Implicit requirements describes requirements that the user community needs but do not mention them explicitly. The reason for not stating the requirements could be due to the assumption that the business analyst is knowledgeable about the domain and would take care of them.

One very simple example of implicit requirement would be that we expect the restaurant to treat its customers well and deliver the food hot and fresh.

Typical sources of implicit requirements are

- Functionalities of the existing system
- Functionalities offered by similar products.

Implicit requirements can be gathered by developing a comprehensive implicit requirements catalog.

Advantages

- ✓ Strong influence on system's acceptance by users.

Disadvantages

- Users may add implicit requirements when discussed where as they may not really need them in the new system.

47. **Inspection, aka formal / technical review**

Inspections are systematic and formal review of requirements following a strict process. To prepare for inspections, requirements are shared with reviewers and reviewers conduct individual prior inspections.

Inspections typically have following phases: Planning, overview, defect detection, defect correction, follow-up and reflection. Reviewers must prepare for inspections.

Planning

Decide on goals of inspection, work products to be inspected and roles and responsibilities for inspection.

Overview

Author explains requirements to reviewers.

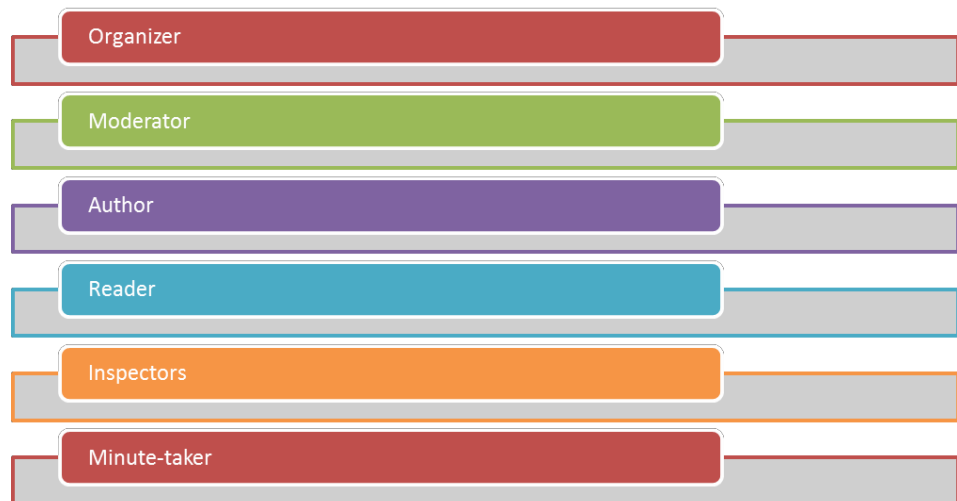
Review requirements

Reviewers find errors with requirements.

Error consolidation

Consolidate identified errors and remove errors identified multiple times or errors that aren't actual errors.

Roles during inspection



1. **Organizer:** Plans and supervises inspection process.
2. **Moderator:** Ensures ground rules set are followed and predetermined inspection process is followed. Moderator should be neutral.
3. **Author:** Explains requirements to reviewers in overview phase and responsible for correcting errors identified.
4. **Reader:** Introduces requirements and guides reviewers. Often, moderator is also reader.
5. **Reviewers:** Responsible for finding errors.
6. **Scribe / Minute-taker:** Takes minutes.

Advantages

- Can improve requirements quality significantly.

Disadvantages

- Time consuming.

48. Interface analysis

Interface analysis identifies interfaces, and interactions between solutions, and/or solution components. Software interface types include:

1. User interfaces, including human users directly interacting with the system, as well as reports provided.
2. Interfaces to, and from external applications.
3. Interfaces to, and from external hardware devices.

Interface analysis can also be useful for non-software solutions, such as when defining requirements for third party deliverables.

Advantages

- ✓ Early identification of interfaces uncovers, and confirms how stakeholders will interact with the application.
- ✓ Provides a framework for subsequent analysis of detailed interface requirements.
- ✓ Provides an early, high-level view of interoperability for planning.
- ✓ Impact on delivery date - Knowing what interfaces are needed, as well as their anticipated complexity, and testing needs enables more accurate project planning, and potential savings in time, and cost.
- ✓ Collaboration with other systems or projects – It is difficult to change existing interfaces. Address

ownership, development, and testing aspects for new interfaces.

- ✓ Negotiate, and cooperate between those responsible for both applications while eliciting, and analyzing interface requirements.
- ✓ Helps in integrating multiple components.

Disadvantages

- Does not provide insight to internal components / aspects of the solution.

49. Interviews

Interviews are the MOST common form of elicitation technique. During interviews, interviewers ask questions to stakeholders. Effective interviewers control discussions, understand needs from all stakeholders, probe deeper when needed and ensure completeness of answers. Interviews are broadly categorized as:

1. Structured interview - Interviewers have pre-defined set of questions.
2. Unstructured interview - There are no pre-defined questions, interviewers and interviewees discuss in an open-ended manner.

Successful interviewing depends on

1. Interviewer, and interviewees understanding of the domain.
2. Interviewer, and interviewees rapport.
3. Interviewer experience.

4. Skill of interviewer in documenting discussions.
5. Interviewee readiness to discuss, and provide the relevant information.
6. Interviewee's knowledge about requirements of system being developed.
7. Ability of the group to reach consumers.

Tips for interviewing

Prepare for interview

1. Define interview's focus or goal.
2. Identify interviewees with most authentic, current, higher relative importance information on the subject.
3. Design interview questions considering format for the interview
- Structured vs. Unstructured. For a structured interview, types of questions can be close ended or open ended.
4. Organize questions - Use a logical order or an order of priority/significance. Examples of order would be general questions to specific questions, start to finish, summary to detail, etc. Order questions based on factors such as interviewee's level of knowledge, and subject of the interview. Follow a logical order rather than jumping around when asking questions.
5. Participants location - Interviews can be conducted in- person or via telephone, web conference, or other remote communication methods. Ensure the interview time, and site are convenient to the interviewee.

Conduct interview

1. Open interview.
2. Conduct interview
3. Maintain focus on the established goals, and pre-defined questions, if structured.
4. Document concerns raised by participants, and address them during the interview or document for follow-up.
5. Listen actively, and paraphrase to confirm what has been understood from the conversations.

Close interview

1. Ask if any areas / information that may have been overlooked.
2. Summarize the session, and remind the interviewees of the upcoming review process.
3. Thank interviewees for their time.

Follow-up, and confirm

1. Prepare and share interview notes to the interviewees for review.

Advantages

- Builds personal rapport.
- Help in understanding individual concerns and expectations.
- User data collection.
- Identifying underlying political factors.

Disadvantages

- Consumes time and effort.
- Unverified opinions.
- Largely qualitative inputs.

50. Job analysis

Job analysis identifies job requirements and competencies needed to perform effectively in a specific job or role.

Organizations use job analysis when drafting job descriptions and when recruiting employees and deciding employee skill enhancement aspects.

Job analysis usually includes details such as work description, work environment, a detailed list of the activities to be performed, list of technical, process and interpersonal skills needed to perform well in the job, list of required training, degrees, and certifications.

Advantages

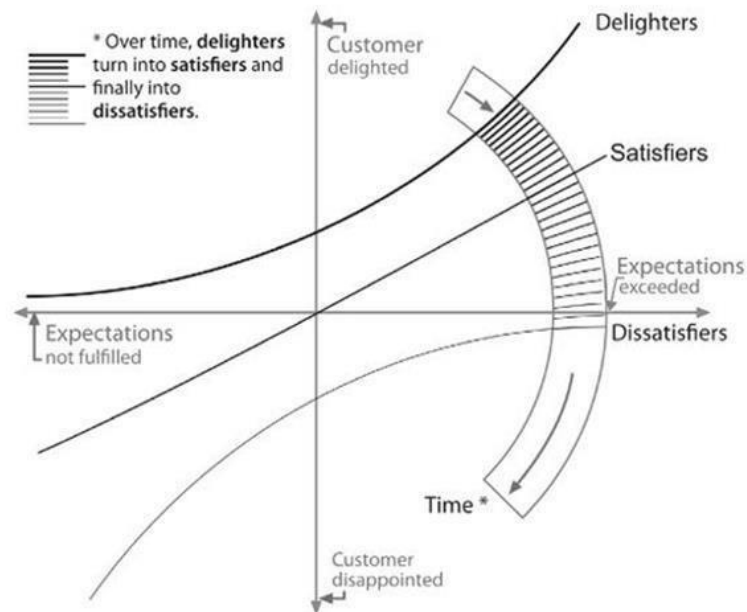
- Helps to understand how particular roles are currently performed by stakeholders.

Disadvantages

- Job descriptions may not be available or they may not be current.

51. Kano model

Kano model classifies system features / requirements into 3 categories:



1. Dis-satisfiers are properties of the system that are self-evident and taken for granted (subconscious knowledge).
2. Satisfiers are explicitly demanded system properties (conscious knowledge). Explicit or stated requirements.
3. Delighters are system properties that the stakeholder does not know or expect and discovers only while using the system — a pleasant and useful surprise (unconscious knowledge).

As time goes by, delighters turn into satisfiers and dissatisfiers as the user becomes accustomed to the properties of the system. When eliciting requirements, all three categories must be considered.

Advantages

- Very useful in segregating requirements.

Disadvantages

- None.

52. Lessons learned process

Lessons learned process analyzes successes, opportunities for improvement, failures, and recommendations for improving the performance of future projects or project phases. Lessons learned sessions can include any format or venue that works for the key participants in these sessions. Lessons learned sessions can review:

- ✓ Business analysis process, activities, deliverables, final product, automation, and technology used or not used, and managerial concerns or issues.
- ✓ How organizational process assets contributed to business analysis, and requirements processes
- ✓ Performance against plan, variances (within acceptable limit, and beyond limit), and possible root causes

- ✓ Corrective, and/or preventive action needed.

Lessons learned sessions can be formal, facilitated meetings with set agendas, and meeting roles, or informal working sessions, or get-togethers. It may or may not include a celebration.

Advantages

- ✓ Can identify improvement opportunities.
- ✓ Build team morale.

Disadvantages

- Participants must avoid blame game as it does not allow honest introspection.
- Unwillingness of participants to discuss, and document problems.
- May become a “gripe” session.

53. Logical data model

Data models describe concepts relevant to a domain in diagrammatic, and textual manner (types of people, places, things etc.), relationships between those concepts, and information associated with them. two most widely used types of data model are - Entity-relationship diagram (ERD), for relational database management systems (RDBMS), and Class diagram, for object-oriented (OO) development.

Logical data models describe the information relevant to an organization.

Logical data models are one level deeper than concept models and are at higher level than physical data models.

Advantages

- Helps to understand entities at a deeper level than concept model. At the same time, it is not too technical like physical data model.

Disadvantages

- Needs understanding of notations used such as Crow-feet diagram.

54. Matrix Model

A table is the simplest form of a matrix. A table is used to convey a set of requirements that have a complex but uniform structure which can be broken down into elements that apply to every entry in the table.

Requirements attributes, and data dictionaries are often expressed in tabular form. Matrices are often used for traceability of requirements to each other, from requirements to test cases, and for gap analysis. Matrices are also used for prioritizing requirements by mapping them against project objectives.

A matrix expresses information in the rows of a table. Rather than presenting repeating information, this form of matrix is

usually intended to indicate that two elements are related in some fashion (for instance, that a requirement affects a

| Description | Planned start date |
|---|--|
| Type of Control | Calendar |
| Data type | Date |
| Format | DD-MON-YY |
| Size | NA |
| Mandatory | No |
| Identifying Key? | No |
| On Screen Length | 8 |
| On Screen Height | 1 |
| Editable | No after submit |
| H Align | Center |
| Validations / Business rules / Role based specific behavior | <p>Must be less than or equal to Planned End Date</p> <p>Must be within project start and end date</p> <p>Must not be less than Project Start Date and must not be after project end date.</p> |
| Lookup Ordering | |
| Likely value for lookup | |
| Default Value | Today's date |
| Look Up Seed Values | |
| Next control | Planned End date |
| Fields dependent on current fields | |
| Field Behavior | |
| | |
| Legacy Table | |
| Column | |
| Transfer Rule | |

particular data element).

Advantages

-
- ✓ Provides high level clarity to developers.

Disadvantages

- ✓ Take time.

55. Meeting techniques

Meetings are inevitable events during business analysis and business analysis. Here are few tips for making meetings effective.

Prior to meeting

1. Is there a clear goal for the meeting?
2. Is there a clear agenda for the meeting?
3. Are only required participants invited?
4. Is the agenda and review material shared well ahead of time?
5. Infrastructure needed for the meeting organized?
6. Are participants instructed to come prepared to meeting?

During meeting

1. Are meeting goals expressed?
2. Are meeting rules described?
3. Is scribe designated?
4. Are discussion points time-boxed?
5. Are updates provided on tasks from previous meeting(s) if applicable?

6. Are the participants following the agenda?
7. Are the discussions within allocated time?
8. Are decisions being recorded?
9. Are action items being identified?
10. Are all decisions and tasks summarized?
10. Are follow-up meetings scheduled if required?

Post-meeting

1. Are minutes distributed within next business day?
2. Are minutes filed?
3. Are tasks tracked and followed-up if not completed by due date?

Advantages

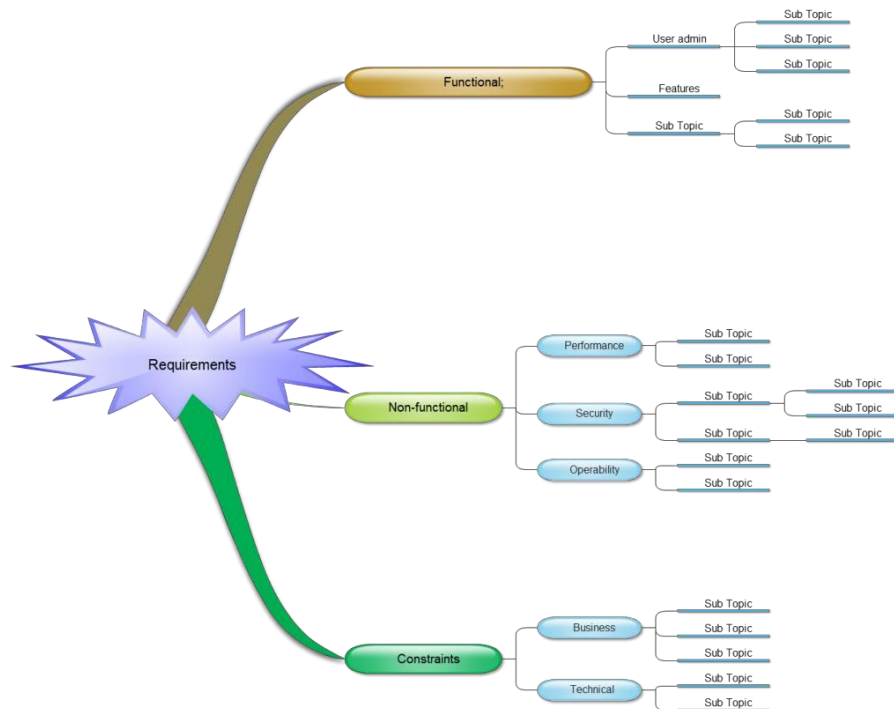
- Helps to conduct effective meetings.

Disadvantages

- None.

56. Mind-mapping

Mind-maps allow to explore requirements from high level to detailed. In the following diagram, we are trying to explore different types of requirements.



Advantages

✓ Very helpful technique to expand requirements. **Disadvantage**

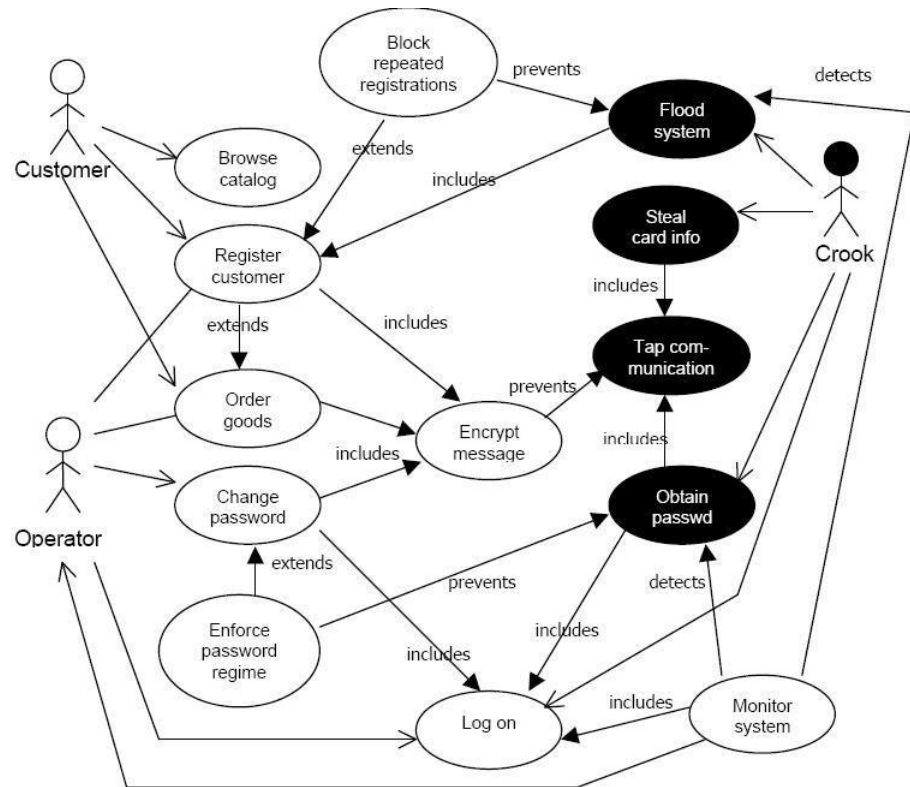
- Needs time.

57. Misuse case

Misuse cases are use cases which should NOT be allowed to be executed. Sometimes there can be un-wanted stakeholders such as hackers who would like to have un-authorized access to application data.

Common misuse cases can be

1. Unauthorized access of data
2. Unauthorized update of data
3. Fraudulent transactions



Advantages

- Helps to prevent undesired actions.

Disadvantages

- None.

58. MoSCoW

MoSCoW analysis divides requirements into four categories: Must have, Should have, Could have, and Won't have.

Must: Requirement must be satisfied for the solution to be considered a success.

Should: Represents a high-priority item that should be included in the solution. Mostly critical requirements but can be satisfied through a work around.

Could: Requirements which are desirable and will be included if time, and resources permit.

Won't: Requirements which will not be implemented in a given release. These may be considered for future releases.

Advantages

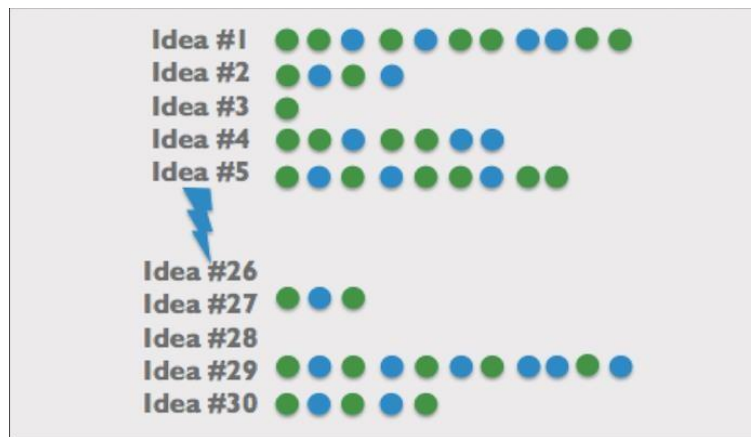
- Simple prioritization technique.

Disadvantages

- Stakeholders tend to put most requirements into Must category.

59. Multi-voting

During multi-voting, participants are provided with set number of votes. They vote on a list of items. Requirements / items with the most votes are considered as higher priority item.



Advantages

- Helps to gain active participation from stakeholders.

Disadvantages

- None.

60. Non-Functional requirements

The umbrella term “non-functional requirement” is often used for quality requirements and constraints. Quality requirements describe qualities of a system that are important to:

- User community, such as usability, learnability, reliability, etc.
- Development community, such as scalability, maintainability, reusability, etc.

Quality requirements often influence the system architecture more than functional requirements do. Quality requirements must be documented explicitly. Quality requirements should be traceable to business needs and other requirements. Include appropriate measures for NFRs to be testable.

Quality requirements are mostly documented using natural language. For example:

- 90% of users shall be able to use basic functions of the system within 6 hours of training.
- The system shall provide 90% of responses in less than 5 seconds.

Performance

Time taken to perform activities and resource utilization levels.

Security

Ability to ensure appropriate confidentiality and integrity

of information, to verify when actions were taken and by whom and to authenticate users.

Reliability

Measure of application being available when needed. Includes ability of the application to recover from errors, uptime, or failures in interfaces.

Usability

The system being usable by target audience with specified duration of training.

Maintainability

Ability to change one component without affecting others and without causing unexpected failures, ability to re-use components and testability.

Portability, also known as Transferability

Ease of installing and uninstalling the application, different environments it can run and ease of migrating it to a new environment.

A useful mnemonic: **CRM POST** (**C**ompatibility, **R**eliability, **M**aintainability, **P**erformance efficiency, **O**perability, **S**ecurity and **T**ransferability)

Advantages

- Critical for project success.

Disadvantages

- Hard to quantify.

61. Observation

During observation, collect requirements by assessing the stakeholder's work environment. This is useful for

- Documenting details about current processes.
- When the project's objective is to enhance or change a current process.
- Stakeholders are unable to express the requirements well.

Observations are 2 types:

1. **Active observation** – Business analyst asks questions during the process.
2. **Passive observation** – Business analyst asks questions at the end.

Steps for observation

Prepare for observation

1. Determine activities to observe.
2. Identify sample users (e.g. experts, and novices or just experts) to observe.
3. Prepare observation questions.

Observe

1. Introduce self.
2. Assure users that their work is not being questioned, and sole purpose is to gather requirements.
3. Inform users that you are present only to study their processes.
4. Refrain from discussing future solutions to any

problems.

5. Inform users to stop the observation process at any time if it interferes with their work.
6. Suggest user to “think aloud” while they are working to share their intentions, challenges, and concerns.

Conduct observation

1. Take detailed notes.
2. For active observation, ask probing questions about why certain processes, and tasks are being performed as they are.

Wrap-up

1. Obtain answers to original questions, or new questions that surfaced during the observation.
2. Provide a summary of notes to the user, as soon as possible, for review, and any clarifications.
3. When observing many users, compile notes at regular intervals to identify commonalities, and differences among users.
4. Review findings with the entire group to ensure the final details represent the entire group, not selected individuals.

Advantages

- Provides realistic, and practical insight into business processes.
- Elicits details of informal communication.
- Identify workarounds which may not be documented.

Disadvantages

- Possible for existing processes only.
- Time-consuming.
- Can be disruptive.
- Can't capture unusual exceptions, critical situations, and intellectual activities.

62. Organization modeling

Organization modelling describes roles, responsibilities, and reporting structures that exist within an organization, and to align those structures with the organization's goals.

Functions: Functionally oriented organizations group together staff based on shared skills or areas of expertise. They encourage a standardization of work or processes within the organization.

Markets: The term "market-oriented" covers a number of different possible ways of organizing an enterprise, all of which are based on serving a particular customer segment rather than on the common skills or expertise of the employees. Market-oriented structures enable the organization to be better oriented with the needs of its customers, but may develop inconsistencies in work performance, and duplicate work in multiple divisions.

Matrix: In matrix model, there are separate managers for each functional area, and for each product, service, or customer group. Staff report into a line manager, who is responsible for the performance of a type of work, and for identifying opportunities for efficiency in the work, and to a market (product/service/project/etc.) manager, who is responsible for managing the product, service, etc. across multiple functional areas.

Organizational charts a very common example of an organizational model.

Advantages

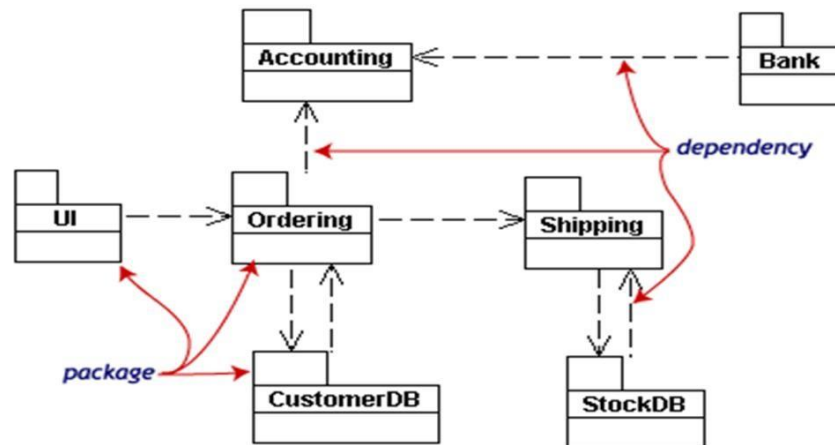
- ✓ Organizational models are almost certain to have defined, even for simplest organizations.

Disadvantages

- Organizational redesigns are likely to be highly contentious, and require significant executive support in order to be successful.
- Does not reflect informal lines of authority, and communication, which are almost certain to exist within the organization.

63. Package diagram

Package diagram are the high level data model. They occupy a place between context diagram and conceptual model.



Advantages

- Helps to understand entities at a higher level but deeper level than context diagram.

Disadvantages

- At high level, need further detailing to be implemented.

64. Persona

A persona defines a typical group of users of a system. To design effective software, it needs to be designed for a specific person.

For example, for a bank, potential personas could be named Mike Miller and Katy Williams. Personas represent fictitious people which are based on knowledge of real users.

Unlike actors in use case diagram, personas are not roles that people play. Personas are different as they describe a typical instance of an actor. In a use case model, we would have a Customer actor, yet with personas we would instead describe several different types of customers to help bring the idea to life.

Each persona may be described in detail by developing personas with real names, personalities, motivations, and often even a photo. The goal is to bring users to life.

Advantages

- ✓ Allows to think and document requirements from different user categories.

Disadvantages

- Will increase number of requirements, hence may increase effort and cost.

65. Perspective-based reading

In perspective-based reading documents are read with a particular perspective in mind, such as perspective of implementers or testers. Aspects not pertaining to the perspective under review are ignored. Different perspectives can be:

- User/ customer perspective
Whether requirements describe the desired functions and qualities of the system from User/ customer

perspective.

- Software architect perspective
Whether requirements contain all necessary information for architectural design such as NFRs.
- Tester perspective
Whether requirements contain information necessary to derive test cases from the requirements.
- Content perspective
Quality of documented requirements.
- Documentation perspective
Follows laid out documentation guidelines.
- Agreement perspective
Whether stakeholders have agreed upon the requirements.
Conflicts, if any, have been resolved.

Advantages

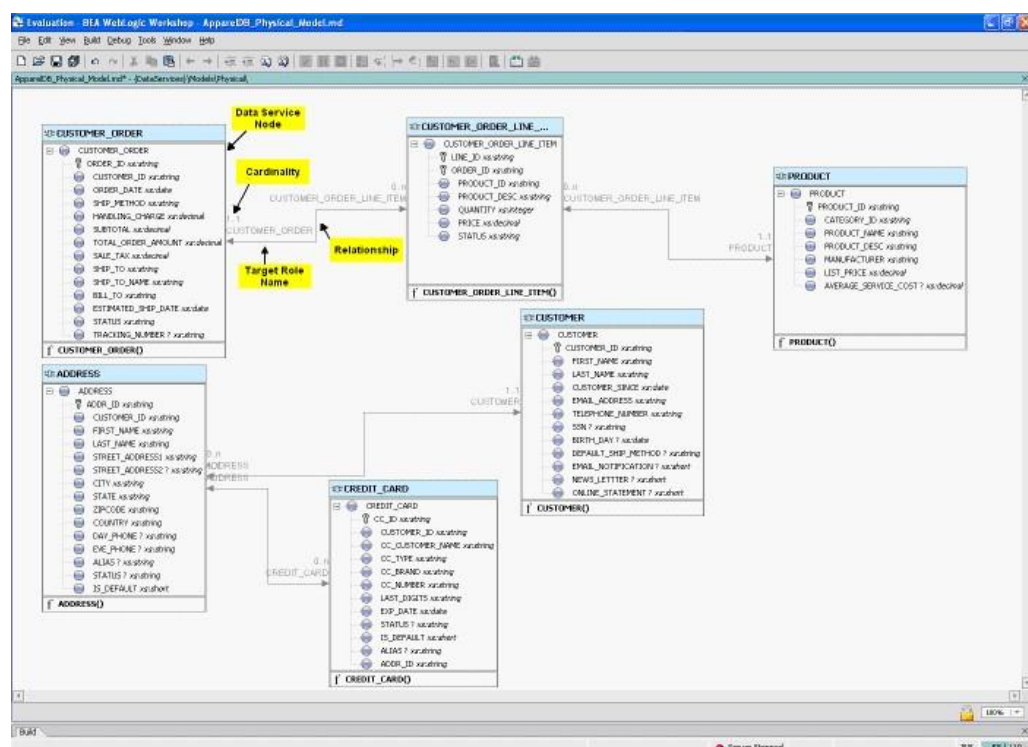
- Allows analysis to be focused on particular parts of the existing documentation.
- Improves defect detection rates.
- Helps detection of types of requirement defects such as missing, ambiguous, inconsistent and extraneous information.
- ✓ Can be a supporting technique for other validation techniques, such as inspections or reviews.

Disadvantages

- Time consuming.

66. Physical data model

Physical data models describe how data is stored, and managed in a software application. Physical data models are the lowest level data model and they are below logical data model.



Advantages

- ✓ Helps to understand entities at a deeper level than concept model.
- At the same time, it is not too technical like physical data model.

Disadvantages

- ✓ Requires understanding of database design concepts.

67. Post it notes

During brain-writing, participants write down their requirements / ideas on post it notes. Each note should contain one requirement. Moderator collects the post it notes and put them up for discussion.

This is a very popular technique for projects following agile based approaches.

Advantages

- ✓ Ideas are collected prior to being discussed. This avoids the problem of anyone dominating the discussion during brainstorming.
- ✓ Ideas can be grouped using affinity diagram.
- ✓ Requirements come in bite sized.

Disadvantages

- Need a good-sized white board to organize the post its.

68. Problem tracking

Problem (includes issues, questions, risks, defects, conflicts, or other concerns that are to be tracked to resolution) tracking provides an organized approach to tracking, management, and resolution of problems.

Management of issues is important to resolve them in a timely manner to ensure project success. A problem tracking system ensures that issues are not simply

neglected or lost. For each problem, tracking technique may include an identification, status, responsible, expected resolution dates, resolution results, actions decisions taken, prioritized, impacts etc. Statuses of problems should be communicated to all relevant stakeholders.

Steps for Problem tracking

Record problem

A problem record may contain some or all of the following information:

- ✓ Description: A clear, and concise description of the problem identified.
- ✓ Raised by: Person who identified the problem.
- ✓ Date identified.
- ✓ Impact: Possible consequences - Impact may be assessed based on schedule, cost or scope.
- ✓ Priority: An example of a priority scale is: Critical, High, Medium, and Low.
- ✓ Need by date.
- ✓ Owner: Team member accountable for the problem.
- ✓ Current status: Examples of statuses can be Open, Assigned, Resolved, Cancelled etc.
- ✓ Action needed to resolve the problem.
- ✓ Responsible for action: Person assigned to take the specific action.
- ✓ Date of completion.
- ✓ Outcome: Results of resolution.

Manage problems

Track, and manage problems until they are fixed or it is

determined that no action will be taken. If problems cannot be resolved in reasonable time, escalate the matter.

Report problem management performance (Metrics)

A useful element to gauge problem resolution process effectiveness is to decide on a set of metrics, and KPIs, measure, and report them. Examples of possible KPIs are:

- Number of problems by status, and priority.
- Cycle time for each problem (Resolution date - Date identified).

Advantages

- ✓ Provides an organized method for tracking, and resolving problems.
- ✓ Timely resolution of problems eliminates or minimizes negative impacts.
- ✓ Resources can be allocated to resolve problems.
- ✓ Assists in identification of root causes of problems.
- ✓ Provides mechanism to communicate problems across the team.
- ✓ Helps to maintain focus on open problems, and ensure resolutions with regular team reviews of the problems.

Disadvantages

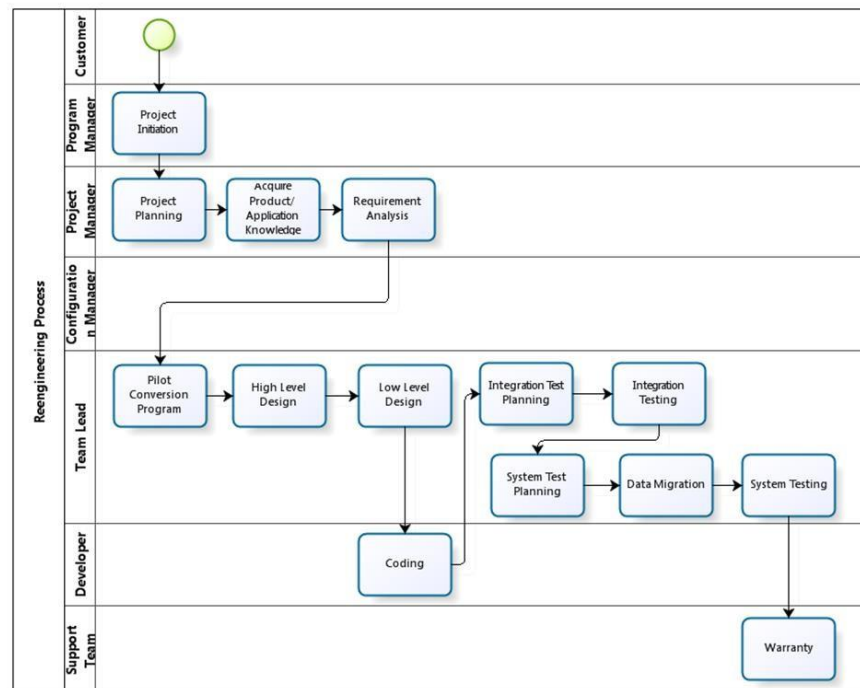
- Lack of regular prioritization, and management of problems makes the list outdated, and irrelevant.
- Unavailability of key team members to discuss problems, and determine actions can make resolutions

very slow to non-existent.

- With a strict deadline to deliver a solution, Problem management may become a lower priority.
- Often root cause analysis of the problems can take more time, and resources than available.

69. Process modeling

Process models describe how multiple people or groups collaborate over a period of time to perform work. Any process is initiated by an event in the business domain. Process model is a visual representation of the sequential flow, and control logic of a set of related activities or actions. Commonly used process models are, flowcharts, UML activity diagrams, and business process modeling notation (BPMN).



Notation elements

- **Activities:** Individual steps or pieces of work to be completed to execute the business process. An activity may be a single task or may be further decomposed into a sub-process (with its own activities, flow, and other process elements).
- **Decisions:** Forks where the flow of work proceeds in two or more flows, and, optionally, where separate flows merge together. A decision may create mutually exclusive or parallel flows.
- **Events:** Events occur outside the scope of a process, and may be the result of actions taken, messages received, or the passage of time. Events may create, interrupt, or terminate processes.
- **Flow:** Indicates the direction of step-by-step sequence of the workflow. In general, diagrams are drawn from top to bottom or in the direction of reading to show the passage of time. Process flow may split to allow for activities to occur simultaneously, and later merge.
- **Roles:** Roles represent types of persons or groups. These typically match those in organization model.
- **Swim-lanes and Pools:** Swim-lanes are horizontal or vertical sections of a process model that show which activities are performed by a particular role. A pool represents an organizational boundary containing many swim-lanes.
- **Terminal points:** Beginning or end of a process or flow. Represents events visible to the organization

or outside of it.

Advantages

- ✓ Most stakeholders are comfortable with process models.
- ✓ Effective at showing how to handle a large number of scenarios, and parallel branches.
- ✓ Have value in their own right, as they will be used for training, and co-ordination of activities.

Disadvantages

- Can become extremely complex, and unwieldy if not structured carefully.
- A single individual may find it extremely difficult to understand a complex process.
- Does not indicate problems in a process.

70. Prototyping

Prototyping details user interface requirements, and integrates them with other requirements such as use cases, scenarios, data, and business rules. Stakeholders often find prototyping to be a concrete means of identifying, describing, and validating their interface needs. Different types of prototypes are:

| | |
|----------------------|--|
| Horizontal prototype | Shallow, and wide view of the system's functionality without any business logic implemented. |
|----------------------|--|

| | |
|--------------------------------------|--|
| Vertical prototype | A deep, and usually narrow slice of the entire system's functionality. |
| Throw-away prototype | Seeks to quickly uncover, and clarify interface requirements using simple techniques, sometimes just paper, and pencil. Focus on functionalities not easily elicited by other techniques, have conflicting viewpoints, or difficult to understand. |
| Evolutionary or Functional prototype | Extends the initial interface requirements into a fully functioning system. Requires specialized prototyping technique or language, and produces a working application. |

Steps for prototyping

Prepare

- ✓ Determine prototyping approach.
- ✓ Identify functionality to be modeled.

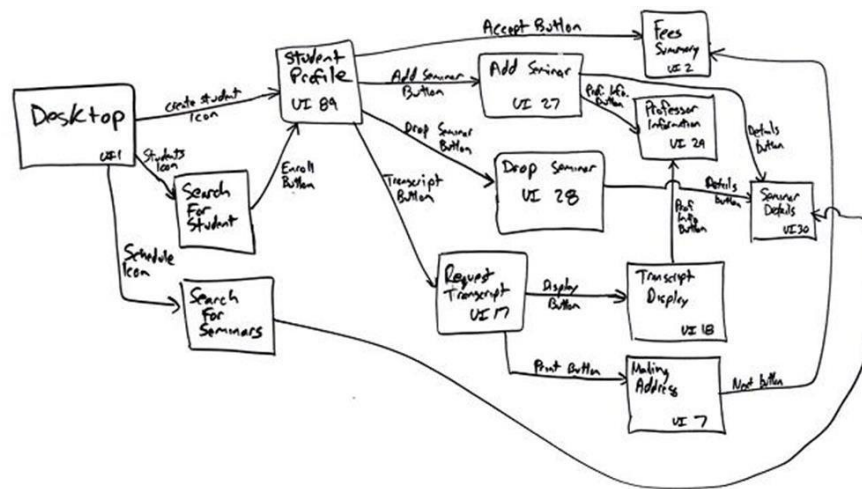
Prototype

Building prototype is an iterative process. Initially outline high-level views. In subsequent iterations, add details depending on scope (horizontal versus vertical).

For example,

- ✓ First prototype of a report may produce a list of report requirements such as data attributes, selection criteria, and derivation rules for totals. Further analysis may draft a detailed layout of the report.

- ✓ For UI prototyping, initial focus is on end-to-end understanding of the interface flows. Later details of each UI.
- ✓ A **storyboard** (also known as a Dialog map, Dialog hierarchy or Navigation flow) portrays navigation paths across interface components. This visual includes abstractions of each screen along with directional arrows that indicate allowable navigation flows.



- ✓ **Screen prototypes** provide data attributes, selection criteria, and supporting business rules.
- ✓ A **screen layout or mock-up** provides a graphical representation of UI elements. Apply organizational standards or style guides.

CVX Systems

Project Governance – Time Sheet

Employee No
Employee Name

August WK1

| Charge Code | Comment | Activity Code | Billable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--------------------|---------|---------------|----------|----------|----------|----------|----------|----------|----------|----------|
| FF1023455 | | A238 | Y | 8 | 4 | 4 | 4 | 8 | 2 | 8 |
| FF9930333 | | D459 | N | 0 | 3 | 3 | 3 | 0 | 2 | 0 |
| FF3774485 | | R330 | Y | 0 | 1 | 1 | 1 | 0 | 4 | 0 |
| Total Hours | | | | 8 | 8 | 8 | 8 | 8 | 8 | 8 |

[Back](#)

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Evaluate Prototype

- ✓ For detailed prototypes, trace logical interface elements to user requirements such as processes, data, and business rules.
- ✓ Validate that the prototype represents user's needs. Scenarios are useful to test interfaces.

Advantages

- ✓ Supports users who are more comfortable, and effective at articulating their needs by using pictures, as prototyping lets them "see" the future system's interface.
- ✓ Allows for early user interaction, and feedback.
- ✓ A throw-away prototype can be an inexpensive approach to quickly uncover, and confirm a variety of requirements that go beyond just the interface such as processes, data, and business rules.
- ✓ A vertical prototype can demonstrate what is feasible with existing technology, and identify technology gaps.
- ✓ An evolutionary / functional prototype provides a

vehicle for designers, and developers to learn about users' interface needs, and to evolve system requirements.

Disadvantages

- Can take considerable time if the process gets bogged down by the "how's" rather than "what's".
- Assumptions about underlying technology need to be made to initiate prototyping.
- Users may develop unrealistic expectations regarding delivered system's performance, completion date, and reliability, and usability characteristics. An elaborated, detailed prototype can look similar to a fully functional system.
- Users may focus on design specifications of the solution rather than the requirements that the solution must address. This can constrain the solution design.
- Developers may believe that they must provide a user interface that precisely matches the prototype, even if superior technology, and interface approaches exist.

71. RACI matrix

RACI matrix describes roles of those involved in business analysis activities. It describes stakeholders as having one or more of the following responsibilities, for a given task or deliverable:

Responsible – Author or creator. Accountable

- Decision maker (only one).

Consulted – To be consulted prior to the work, and gives

input.

Informed - To be notified of the outcome.

Advantages

- ✓ Helps to clarify various responsibilities.

Disadvantages

- ✓ None.

72. Ranking and Top-ten technique

Ranking: Stakeholders arrange requirements to be prioritized with respect to a specific criterion.

Top-ten technique: In this technique, 10 most important requirements for a defined criterion are selected. For these requirements, a ranking order is determined.

Advantages

- ✓ Simple technique to prioritize requirements.

Disadvantages

- ✓ None.

73. Release planning

Release planning is an agile development activity to distribute epics and user stories across different releases. Release planning is conducted periodically to ensure releases deliver maximum value to business.

Advantages

- ✓ Allows to agile development team to deliver maximum business value.

Disadvantages

- None.

74. Report table

Report table captures detailed requirements for reports.

Common attributes of report table include: ID, Name, Description, Decisions made from the report, Objectives, Audience, Trigger, Data fields, Data volume, Frequency, Display format, and Calculations.

Also provide a prototype or example of the actual report to provide contexts to developers.

| Parameter | Value |
|-------------|---|
| Unique ID | SCH001 |
| Name | Schedule variance report |
| Description | Shows schedule variance for tasks in a particular milestone |

| | |
|-----------------------------------|--|
| Decisions Made from Report | Expedite delayed tasks |
| Objective | Monitor project schedule |
| Priority | High |
| Functional Area | Project management |
| Related Reports | Daily, Weekly and Monthly status reports |
| Report Owner | Head-PMO |
| Report Users | PMs and above |
| Trigger | On user request |
| Frequency | NA |
| Latency | Max 5 seconds |
| Transaction Volume | ~ 20 times a day |
| Security | PMs and above |
| Persistence | Keep filters |
| Visual Format | Provided in a separate tab |
| Delivery Format | Excel and PDF |
| Interactivity | User can select filters |
| Drilldowns | NA |

Report prototype

| Element name | Schedule name | Planned End Date | Actual End Date | No. of days delayed | % Variance |
|---------------|---------------|------------------|-----------------|------------------------------------|--|
| Source | Schedule | Schedule | Schedule | | |
| Calculation | NA | NA | NA | Actual end date - Planned End Date | (Actual end date - Planned End Date) / (Planned End Date - Planned Start Date) |
| Filter | No | No | No | Yes | Yes |
| Sort | | | | | Yes |
| Group | | | | | Yes, Group by 20% |
| Display rules | | | | | 0 decimals |

Advantages

- ✓ Helpful to provide additional details about reports that cannot be gathered by looking at a report mock-up.

Disadvantages

- ✓ Takes time.

75. Requirements attribute chart

Requirements attributes chart provides a comprehensive list of requirements attributes. Business analysts can pick up suitable attributes for managing requirements in their projects.

| Attribute Type | Meaning |
|----------------|---|
| Identifier | Unique identifier of a requirement / artefact. |
| Name | A short description. |
| Description | Long description of the requirement. |
| Rank | Order of the requirement in a set of requirements. Rank should be unique in a chosen set of requirements for implementation. |
| Version | Current version of requirement. |
| Author | Specifies author of requirement. |
| Source | Specifies source of requirement |
| Stability | Specifies approximate stability of requirement. Stability is amount of changes that are to be expected for requirement. Possible values can be "Fixed", "Established" and "Volatile". |
| Criticality | Specifies impact of requirement on business. Possible values can be "High", "Medium" and "Low". |
| Priority | Specifies priority of requirement. |
| | Priority determines order implementation. |

| | |
|-----------------------------|---|
| Assigned to | Specifies person, group of stakeholders, organization, or organizational unit that is responsible for the requirement. |
| Requirement type | Specifies type requirement (e.g., "Functional requirement", "Quality requirement", or "Constraint"). |
| Status regarding content | Specifies current status of requirement content, e.g., "Idea", "Concept", "Detailed content". |
| Status regarding validation | Specifies current status of validation, e.g., "Un-validated", "Erroneous", "In correction". |
| Status regarding agreement | Specifies current status of negotiation, e.g., "Not negotiated", "Negotiated", "Conflicting". |
| Estimated Effort | Estimated effort to implement requirement. |
| Release | Release in which requirement shall be implemented. |
| Legal obligation | Specifies degree of legal obligation of requirement. |
| Cross references | Specifies relations to other requirements, for example, if it is known that implementation of requirement requires prior implementation of another requirement. |
| Remarks | Any information which is of stakeholders' interest. |

The screenshot displays the Adaptive Management System interface. On the left is a navigation tree with categories like GRCPerfect, Adaptive, Tool Administration, Project Management, etc. The main area shows 'Product Backlog Details' for WBS 322. The details include:

- WBS:** 322
- Version:** 0.1
- Rank:** 1
- Description:** Daily status report - include attendance details, effort capture details as well. Mail the report everyday @ 8pm to the entire devteam
- Reason:** (Empty field)
- Business Impact:** (Empty field)
- Planned Start Date:** 22 Apr 15
- Planned End Date:** 22 Apr 15
- Assigned To:** V Madhu Latha
- Author:** Deepa Ganesh
- Criticality:** Low
- Content Status:** Idea
- Agreement Status:** Not Negotiated
- Status on Acceptance:** Accepted
- Size:** 2 Medium
- Requested By:** Deepa
- Test Strategy:** (Empty field)
- Requested on:** 20 Apr 15
- Source:** Product owner
- Milestone:** 2015 Apr Sprint - Wk3
- Priority:** Low
- Stability:** Volatile
- Requirement Type:** Functional Requirement
- Validation Status:** Non-Validated
- Legal Obligation Level:** No
- Status on Implementation:** Yet to be implemented
- Effort:** 5.00 Person-Hour
- Change Type:** Requirements

In the above screen-shot, requirement documented has WBS "322" as its unique identifier. It bears description, "Daily status report - include attendance details, effort capture details as well. Mail report everyday @ 8pm to entire devteam" that specifies subject of this requirement. Stability of this requirement is classified as "Idea", "V Madhulatha" is person responsible for this requirement and requirement stems from source "Product Owner". "Deepa Ganesh" is author.

Advantages

- ✓ A good list to refer to.

Disadvantages

- ✓ None.

76. Requirements modeling chart

Requirements modeling chart helps in choosing right modeling techniques for requirements.

| Model class | Description | Modeling techniques |
|----------------------------------|---|---|
| User classes, Profiles, or Roles | <p>People who directly interact with a solution.</p> <p>Each role groups people with similar needs, expectations, and goals.</p> <p>Roles are usually identified by conducting stakeholder analysis.</p> <p>Each role is likely to correspond to one or many stakeholders, and can be potential source of requirements.</p> | <p>Organization models</p> <p>Process models</p> <p>Use cases</p> |
| Concepts, and Relationships | <p>Concepts describe something in the real world; a place, a person, a thing, an organization. They define the objects, entities or facts relevant to the business domain, and their relationships.</p> | <p>Data models such as Entity relationship diagram, and Class diagram</p> |
| Events | <p>A request to a business system or organization to</p> | <p>Scope model</p> <p>Process model</p> |

| | | |
|-----------|--|--|
| | do something, such as customer order, or requesting a report. Organization must respond to an event, and in most cases an event will trigger or affect a business process. Events can come from outside or from within the business area, or occur at scheduled times. | State diagram Use case |
| Processes | Processes are a sequence of repeatable activities executed within an organization. Processes can be simple (involving one person, and a system) or complex (involving many people, departments, organizations, and systems). Processes describe who, and what has to be involved in fully responding to an event, or how people in the enterprise collaborate to achieve a goal. | Process model Organization model State diagram Use case |
| Rules | Rules are used by the enterprise to enforce | Declarative statements |

| | | |
|--|---|--|
| | goals, and guide decision-making. They determine when information associated with an entity may change, what values of information are valid, how decisions are made in a process, and what the organization's priorities are. Business rules are normally described as declarative statements. | Process model State diagram Use case |
|--|---|--|

Advantages

- ✓ Helps to identify right modeling technique.

Disadvantages

- ✓ None.

77. Requirements prioritization techniques

Requirements prioritization techniques help in prioritizing techniques.

| Prioritization Basis | Description |
|----------------------|--|
| Business value | Prioritize requirements on their relative value to the organization based on cost-benefit analysis . High |

| | |
|------------------------------------|---|
| | value requirements are developed early. Commonly used when enhancing an existing solutions, or when delivering solution incrementally. |
| Business or technical risk | Prioritize requirements with highest risk of failure . Implemented first to ensure that, if the project fails, it fails with least expenditure. |
| Implementation difficulty | Prioritize requirements which are easiest to implement . Common when piloting a new development process, technique or when rolling out a packaged solution. This helps the project team to gain familiarity, and develop competence by working on lower-risk requirements. |
| Likelihood of success | Prioritize requirements which are likely to produce quick, and relatively certain successes . Common when a project is controversial, and stakeholders need early signs of progress to support the initiative. |
| Regulatory or policy compliance | Prioritize requirements to meet regulatory or policy demands. This can take precedence over other stakeholder interests. |
| Relationship to other requirements | Prioritize requirements which support other high-priority requirements. |
| Stakeholder agreement | Prioritize requirements based on stakeholders consensus on which requirements are most useful or valuable. Often used in combination with one or more of the other approaches described above. |
| Urgency | Prioritizes requirements based on time sensitivity. |

Advantages

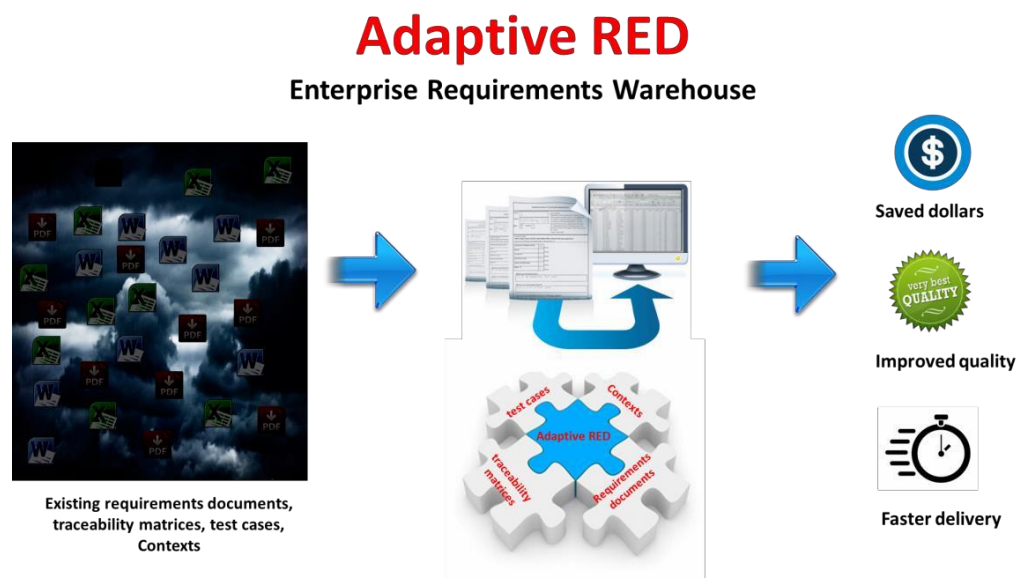
- ✓ Helps to connect related issues.

Disadvantages

- ✓ None.

78. Requirements warehouse

Requirements warehouse stores current and past project requirements, traceability matrices and associated test cases. They also help in building contexts around the requirements such as domain, sector, industry, geography, customer etc.



Advantages

- ✓ Helps in requirements reuse, thus improving quality, reducing delivery time and saving project costs.

Disadvantages

- ✓ Needs investment.

79. Requirements workshops

Requirements workshop, also known as JAD (Joint application design) session, is a highly productive focused event attended by carefully selected key stakeholders, and SMEs for a short, intensive period (typically one or a few days).

Experienced, neutral facilitators must facilitate requirements workshops. Scribes document requirements, and outstanding issues. Business analysts may act as facilitators, or scribes or be participants in case they are SMEs on the topics. However, they must approach the participant role with caution, as it can confuse others as to their role of business analysts. Also others may suspect the business analysts who are also participants may unduly bias the requirements towards their own viewpoints, and priorities.

Workshops can be used to generate ideas for new features or products, to reach consensus on a topic, review requirements, capture detailed requirements in models.

Prepare for requirements workshop

- ✓ Clarify stakeholders' needs, and purpose of the workshop.
- ✓ Identify critical stakeholders for the workshop.
- ✓ Define workshop's agenda.
- ✓ Determine how to document outputs of the workshop.
- ✓ Schedule sessions.

- ✓ Arrange logistics, and equipment, including seating, flipcharts, projectors etc.
- ✓ Send materials in advance to so that attendees come prepared. This increases workshop productivity.
- ✓ Conduct pre-workshop interviews with attendees to ensure the purpose of the requirements workshop is understood, and aligned with the needs the attendees.
- ✓ Ensure any preparation needed for the session by the attendees is understood. Note that these are not requirements interviews.

Conduct requirements workshop

- ✓ Elicit, analyze, and document requirements.
- ✓ Obtain consensus on conflicting views.
- ✓ Maintain focus by frequently validating workshops activities with the stated objectives.

Facilitator's responsibilities are:

- ✓ Establish a professional, and objective tone for the workshop.
- ✓ Introduce goals, and agenda.
- ✓ Enforce discipline, structure, and ground rules for the workshop.
- ✓ Manage the workshop, and keep the team on track.
- ✓ Facilitate decision-making, and building consensus, but avoid participating in the discussion.
- ✓ Ensure all stakeholders participate, and have their inputs heard.
- ✓ Ask right questions including analyzing information

being provided, and following up with probing questions, if necessary.

Scribe's responsibilities are:

- ✓ Document requirements in the format determined prior to the workshop.
- ✓ Keep track of any items or issues that are deferred during the session itself.
- ✓ Post requirements workshop wrap-up
- ✓ Follow up on any open action items recorded at the workshop.
- ✓ Complete documentation, and distribute it to stakeholders.

Advantages

- ✓ Helps in getting detailed requirements in a short time.
- ✓ Means for stakeholders to collaborate, work together to reach consensus, make decisions, and gain mutual understanding of requirements.
- ✓ Costs lower than cost of performing multiple interviews as interviews may yield conflicting requirements, and resolving the same can be very costly.
- ✓ Stakeholders can immediately validate facilitator's interpretation of requirements, so feedback is immediate.

Disadvantages

- Difficult to schedule due to stakeholder unavailability.
- Success is highly dependent on the expertise of the

facilitator, and knowledge of the participants.

- Too many participants can slow down the workshop process.
- Not collecting inputs from all participants can lead to overlooking of important requirements.

80. Retrospectives

Retrospectives are meetings conducted periodically or at a milestone to discuss past performance and set guidelines for future. They have been used in Kanban, agile approaches (e.g., Scrum and eXtreme programming), Lean methods, such as Kaizen and continuous improvement.

During retrospective, project team reflects on their successes and areas for improvement. Facilitator ensures participation from all and guides the team to determine a course of action.

Retrospectives usually have following steps:

1. Facilitator sets the stage – context and tone for the meeting.
2. Facilitator asks the team 3 simple questions:
 - a. What is working?
 - b. What is not working?
 - c. What needs to change?
3. Team gathers relevant data.
4. Facilitator uses charts and other visual methods to capture the information presented
5. Team generate insights – Establish cause and effect.
6. Team collaborate to determine improvement action.

7. Facilitator closes the meeting.

Retrospectives:

1. Retrospectives occur regularly and frequently, such as weekly or at the end of each sprint, or at the end of a Kanban delivery.
2. Retrospectives are conducted in a highly collaborative fashion and decisions made are most often implemented with little formal documentation.
3. Implementation is quick.

Lessons learned

1. Conducted at the end of stage gates or a phase such as a project closeout or when events occur that are worth learning from.
2. Learnings are formally documented and stored in a repository for future reference.
3. Project teams leverage lessons learned repository as an input prior to planning work on subsequent projects.

Advantages

1. A good learning process for the team.

Disadvantages

1. Too much frequency can take up team time.
2. Not a replacement for training and coaching staff on process.

81. Requirements reuse

Requirements from previous projects, if maintained at required level of detail in a proper database, can be reused. Common challenges to re-use are:

1. Lack of investment in re-use as re-use is not beneficial to current project.
2. Lack of availability of organizational requirements database to catalog and search for reusable requirements.
3. Developers always believe they can develop better components.

Advantages

- ✓ Costs and time to market can be significantly reduced.
- ✓ Requirements need not be re-validated.
- ✓ Ensure consistency of requirements within organization or program.
- ✓ Designs, code and test cases already available for these requirements can be reused.
- ✓ Re-used products tend to have better quality.

Disadvantages

- Reusing components may lead to changes in requirements, such as speed, memory, implementation language, operating system etc.
- Component libraries often lead to larger and less efficient implementations.

- New versions of purchased components (called COTS, or Commercial Off-The-Shelf) are not controlled by the development organization and may affect system evolution.

82. Reverse walkthrough

During reverse walkthroughs, the receiving parties (developers, solution implementers, business analysts) explain the requirements to providing parties (business analysts, customers).

Advantages

- ✓ Helps to reduce communication gap that exists between requirements providers and recipients.

Disadvantages

- ✓ Takes time.

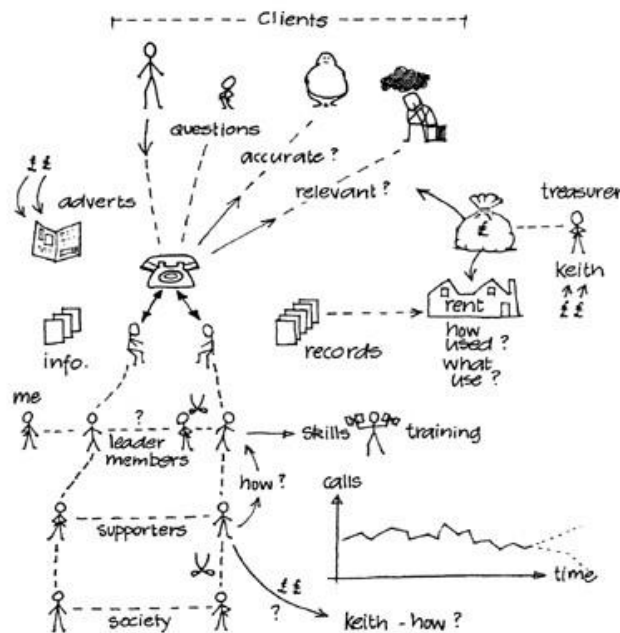
83. Rich picture

Using rich pictures, one can portray a current / desired situation / process. Rich Pictures provide a mechanism for learning about complex or ill-defined problems by drawing detailed ("rich") representations of them. Typically, rich pictures follow no commonly agreed syntax, usually consist of symbols, sketches or "doodles" and can contain as much (pictorial) information as is deemed necessary.

Groups can produce Rich Pictures during group discussions. By having everybody contribute to a Rich Picture they can be used to help develop a shared understanding of a given

situation.

Mind maps are often considered to be Rich Pictures, but are mainly text-based and have some degree of formality with respect to their structure.



Advantages

- ✓ Of good value to other stakeholders as it capture many different facets of the situation
- ✓ Forces stakeholders think deeply about the problem and understand it well enough to express it pictorially.
- ✓ Can be collaboratively developed and helps in shared understanding.

Disadvantages

- Takes time.

84. Risk management

Risks are event which can negatively affect business analysis outcomes. Requirements risks can be from different sources, such as stakeholders, business environment, and customer etc.. Requirements risks can be from different sources, such as stakeholders, changing business environment, changing customer preferences.

Risks are typically measured using risk prioritization number which is multiplication of impact of risk and probability of risk occurrence. Risks which have high prioritization number are usually accorded higher resolution priority.

Risk management identifies, and manages areas of uncertainty that can impact an initiative, solution, or organization. Risk management involves understanding the risk tolerance levels of the organization, assessing risks, and identifying responses.

Business analysis faces common risks such as

1. Lack of needed support by stakeholders
2. Stakeholders non-availability
3. All needed requirements not being captured
4. Stakeholder conflicts etc.

Risk management involves:

1. Risk identification

Identify all possible risks for business analysis. Techniques for this are brainstorming, risk checklists etc.

2. Risk assessment

Assessment involves determining the probability that the risk will occur, and the impact if it does occur. Each of these factors is assessed on a common scale (High, Medium, and Low, a number from 1–5, and so forth). This enables management to focus on the most important risks.

3. Risk management

Identify options for managing critical risks identified after risk management.

Advantages

- ✓ Enables business analysts to prepare for the likelihood that at least some things will not go as planned.

Disadvantages

- Number of possible risks can easily become unmanageably large. It may only be possible to manage a subset of potential risks.
- Difficult to usefully estimate the impact of the risks.

85. Root cause analysis (RCA)

Root cause analysis (RCA) is a structured examination of any aspect of a situation to establish the root cause.

Two popular techniques for RCA are [Fish-bone diagram](#), and [Five-whys](#).

Fish-bone diagram

Fishbone diagrams (also known as Ishikawa or Cause-and-effect diagram) are used to identify, and organize possible causes of a problem. Fishbone diagram helps to focus on the cause of the problem versus the solution, and organizes ideas for further analysis.

Steps to develop a cause-and-effect diagram:

- ✓ Capture the issue or problem in a box at the right end of the diagram.
- ✓ Draw a line from the box across the paper or white board (forming the spine of the fishbone).
- ✓ Draw diagonal lines from the spine representing major categories of potential causes (people, process, techniques, and policies).
- ✓ Draw smaller lines to represent deeper causes on each major cause.
- ✓ Brainstorm categories, and potential causes of the problem, and capture them under the appropriate categories.
- ✓ Analyze the results. Remember that the group has

identified only potential causes of the problem. Further analysis is needed to validate the actual cause, ideally with data.

- ✓ Brainstorm potential solutions once the actual cause has been identified.

Five-whys

Five-whys is a question-asking process to explore the cause of a problem. Five-whys approach repeatedly asks questions in an attempt to get to the root cause of the problem.

This is one of the simplest facilitation techniques to use when problems have a human interaction component.

Steps to use:

- ✓ Write the problem on a flip chart or white board.
- ✓ Ask "Why do you think this problem occurs?", and capture the idea below the problem.
- ✓ Ask "Why?" again, and capture that idea below the first idea.
- ✓ Continue with step 3 until you are convinced the actual root cause has been identified.

Five-whys may take more or less than five times of asking why. The technique is called five-whys because often it takes that many whys to reach the root cause, not because it must be asked five times. Five-whys can

be used alone, or as part of the fishbone diagram technique. Once all ideas are captured in the diagram, use five-whys approach to drill down to the root causes.

Advantages

- ✓ Structured method to identify root causes of identified problems.
- ✓ Assists in complete understanding of the problem under review.

Disadvantages

- May need formal training or extensive experience to facilitate a team of experts.
- Facilitator may not remain objective.

86. Round robin

During round robin technique, facilitator collects ideas from each participant one after another and put them up for discussion.

Advantages

- ✓ Every participant provide inputs. This avoids the problem of anyone dominating the discussion during brainstorming.

Disadvantages

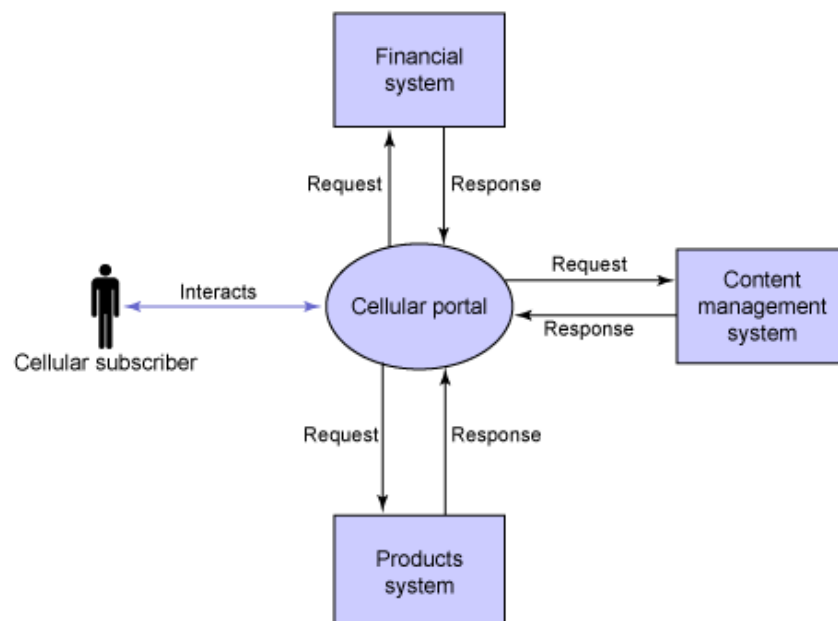
- Takes time.

87. Scope models

Scope models describe scope of analysis or scope of a solution. They serve as a basis for defining, and limiting the scope of business analysis, and project work. Scope models allow the definition of a “complete” scope—that is, the boundaries of the scope correspond with the natural boundaries of a business domain.

Select scope model depending on analysis techniques selected to further explore the scope.

- **Context diagram** is top most level data flow diagram. It uses a single data process to describe the scope, and shows the external entities, and data stores that provide data to, and receive data from the system. Context diagrams are still used on many projects that do not use data flow diagrams.

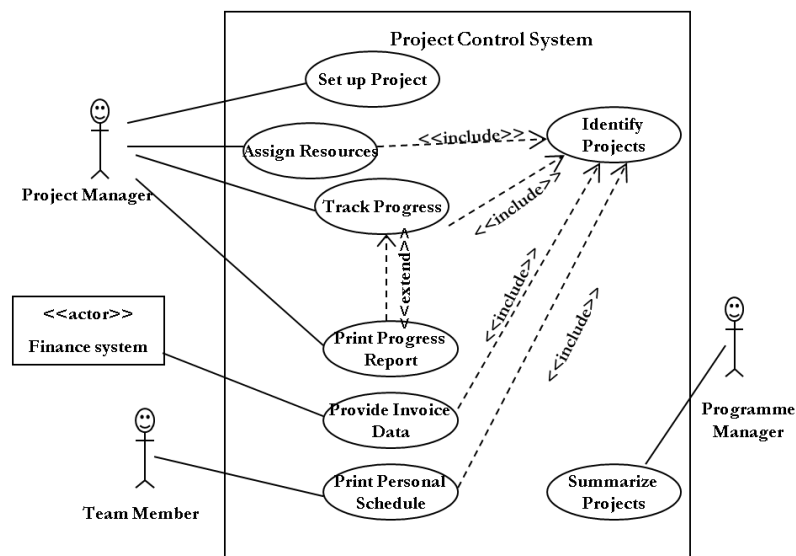


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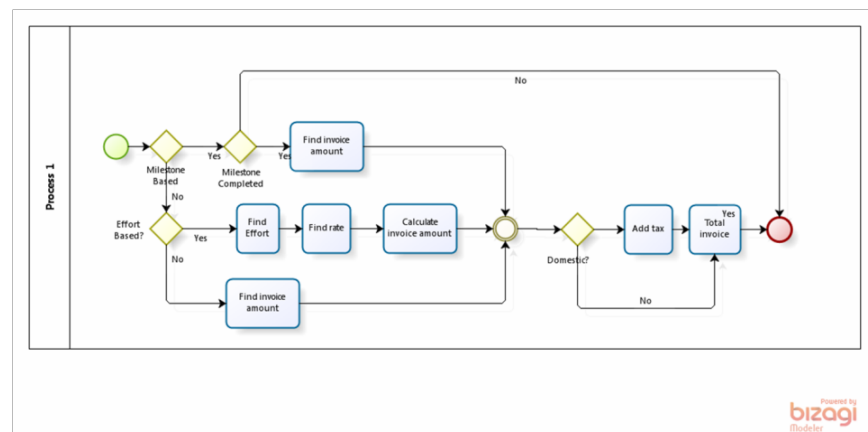
- **Context diagram** is top most level data flow diagram. It uses a single data process to describe the scope, and shows the external entities, and data stores that provide data to, and receive data from the system. Context diagrams are still used on many projects that do not use data flow diagrams.
- **Events** are external to the boundaries of the system being studied (a customer makes a request, a partner sends a message). Temporal events are driven by time (e.g. monthly or annual reports). Once events are identified, processes needed to respond to the event can be documented, and further analyzed, using process modeling techniques.
- **Feature** is a service that the solution provides to fulfill one or more stakeholder needs. Features are high-level abstractions of the solution that must later be expanded into fully described functional, and supplemental (quality or non-functional)

requirements. They allow for early priority, and scope management, and for validating the stakeholders' view of the solution.

- **Use case** diagrams visually depict use cases supported by a system, actors who trigger those use cases, and relationships between use cases.



- **Business process** at high level can also be used as a scope model.



Advantages

- ✓ Helps to determine whether requirements are in, and out of scope for a solution.

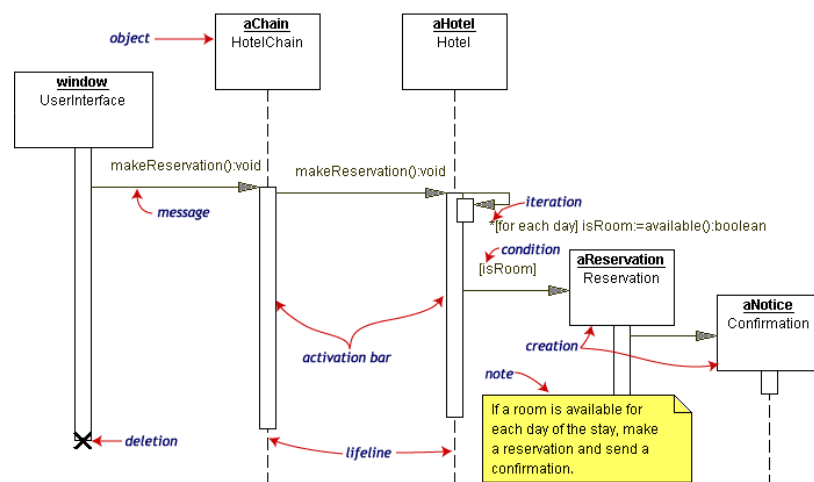
Disadvantages

- Usually high level, needing further investigation.

88. Sequence diagrams

Sequence diagrams model logic of usage scenarios, by showing the information (also known as stimuli, or message) passed between objects during execution of a scenario.

Sequence diagrams show how objects (interface components or software components) used in the scenario interact but not how they are related to one another. Classes required to execute the scenario are displayed on the diagram, as are the messages they pass to one another (triggered by steps in the use case).



Sequence diagrams show particular instances of each object with a lifeline beneath each object to indicate when the object is created, and destroyed. The earliest events in the scenario are depicted at the top of the lifeline, with later events shown further down. Arrival of the stimulus at the object is called an event.

Sequence diagrams only specify ordering of events, not exact timings of events.

A message is shown as an arrow pointing from the lifeline of the object sending the message to the lifeline of the object receiving it. Message control flow describes the types of messages sent between objects.

Procedural flow transfers to the control to the receiving object. The sender cannot act until a return message is received.

Asynchronous flow (also known as a signal) allows the object to continue with its own processing after sending the signal. The object may send many signals simultaneously, but may only accept one signal at a time.

Advantages

- ✓ Used in object-oriented analysis to validate class

diagrams against use cases.

- ✓ Shows sequence (timing) of interactions between entities within the system scope.

Disadvantages

- Must be defined for each possible scenario.
- Ideally requires a fully defined class model, although less-formal sequence diagrams are often developed that represent user interface elements or interactions between actors.

89. Sign-off

During sign-off, stakeholders sign-off on agreed requirements. Requirements discovered later go for scope change process.

Advantages

- ✓ Helps to have a baseline for development.
- ✓ Useful in complex legal implication projects.

Disadvantages

- ✓ In rapidly changing business scenarios, this may create trouble for business.

90. Sprint planning

Sprint planning is an agile development activity to distribute planned user stories for a release across different sprints.

Sprint planning is conducted prior to every sprint to ensure sprints deliver maximum value to business.

Advantages

- ✓ Allows to agile development team to deliver maximum business value.

Disadvantages

- None.

91. Sprint retrospective

Sprint retrospective is an agile development activity to analyze successes, opportunities for improvement, failures and recommendations for improving the performance of future sprints.

Sprint retrospective can review

- ✓ Sprint process, activities, deliverables, final product, automation and technology used or not used and managerial concerns or issues.
- ✓ Performance against plan, variances (within acceptable limit and beyond limit) and possible root causes
- ✓ Corrective and/or preventive action needed

Advantages

- ✓ Can identify improvement opportunities.
- ✓ Build team morale.

Disadvantages

- Participants must avoid blame game as it does not allow honest introspection.
- Unwillingness of participants to discuss and document problems.
- May become a “gripe” session.

92. Sprint review

Sprint review is an agile development activity to demo the outcome of a sprint to different stakeholders, especially product owner.

This session is conducted at the end of the sprint to decide whether the sprint outcomes can be potentially shipped to customers.

Advantages

- ✓ Gate keeping measure before releases.

Disadvantages

- Absence of product owners and stakeholders makes this ineffective.

93. Stakeholder list

A “stakeholder” is any person or organization that is actively involved in a project, or whose interests may be affected positively or negatively by execution of a project. Stakeholders can be internal to the organization or external. They may be employee groups, parent-teacher associations or neighborhood groups. For any given project or decision, there can be dozens of stakeholders.

Business analyst must identify and list all potential stakeholders for a project.

A stakeholder list is a list of potential stakeholders for business analysis.

Advantages

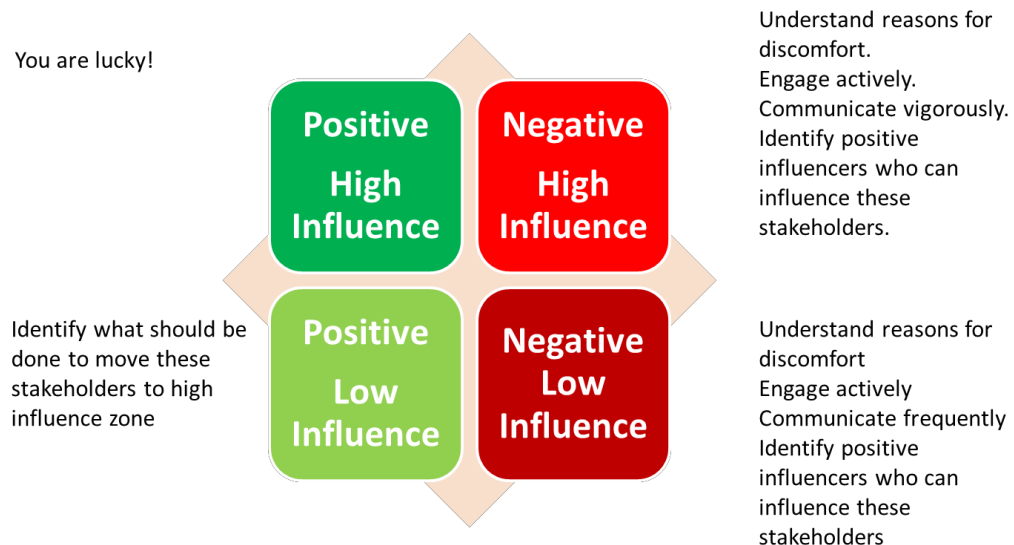
- ✓ Ensures no stakeholders have been left out.
- ✓ Involving stakeholders can build trust, which lead to increased consensus for your project or final decision.

Disadvantages

- ✓ May add stakeholders to the project who may not be critical to the project success.
- ✓ This may lead to additional requirements, cost and schedule.

94. Stakeholder map

Stakeholder maps are visual diagrams depicting relationships of stakeholders to the solution, and to one another. A matrix mapping levels of stakeholder influences against their interests.



An onion diagram indicates involvement of stakeholders with the solution. Stakeholders who directly interact with the solution, or participate in a business process, part of the larger organization, and outside the organization.

Advantages

- ✓ Helps to visually map stakeholder positions and develop appropriate management strategies.

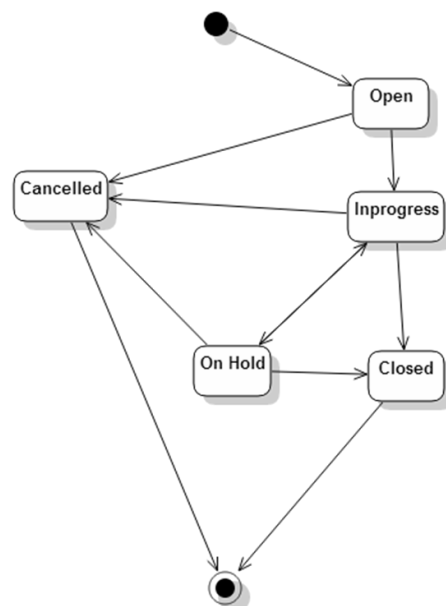
Disadvantages

- ✓ Can create challenge if exposed to stakeholders.

95. State chart diagram

State defines a period of time in which a system shows a particular behavior and waits for particular event(s) to occur. On particular event(s), a state transitions to a new state. States usually have a Start state (Origin state) and a final state (Final state).

State chart diagram shows various states and allowable movements among the state.



Advantages

- ✓ Helps in discovering rules for state movement.

Disadvantages



- ✓ None.

96. State table

State tables show valid states of an object and any allowed transitions between those states in a tabular format. It shows all of the valid states in the first column and across the first row.

Each cell represents the transition from the state in the row to the state in the column. Transitions that are not allowed have cells that are marked with "X," "N/A" or "No".

Allowed transitions are represented in cells with either "Yes" or a description of the transition event that leads to the transition.

| <div>Future state </div> <div>Current state </div> | Open | In-progress | Closed | On Hold | Cancelled |
|--|------|-------------|--------|---------|-----------|
| Open | NA | Yes | No | Yes | Yes |
| In-progress | No | NA | Yes | Yes | Yes |
| Closed | No | No | NA | No | No |
| On Hold | No | Yes | No | NA | Yes |
| Cancelled | No | No | No | No | NA |

Advantages

- ✓ Help in discovering business rules for transition.

Disadvantages

- ✓ None.

97. Structured walkthrough

Structured walkthroughs, also known as business requirements reviews, are working sessions where invited participants review, and discuss a set of business requirements. They are performed to communicate, verify, and validate business requirements. Record all questions, comments, concerns, and suggestions that arise during the walkthrough. Inspection is similar, but follows a more formal process, and uses checklists, and other techniques.

Pre-requisites of Structured walkthrough

- ✓ A completed business requirements package - A review may cover only one requirement document, several related documents, or an entire business requirements package.
- ✓ A list of appropriate reviewers, who may be project stakeholders, business analysts, or other stakeholders with specific expertise in the type of business requirements being reviewed. Appropriate reviewers include stakeholders or representatives who contributed to the business requirements, Implementation SMEs, and representatives of sponsor or end users. Management of those organizational units must approve, and authorize these individuals to make decisions as their representatives. This is a voting by proxy.
- ✓ A meeting vehicle. Reviews can be held physically in

a conference room with all participants present or using a technical facility allowing remote participation.

Review scope

- ✓ Provide reviewers with a checklist of items for review. Examples may include, out of scope business requirements, solution elements instead of business requirements, or accuracy of the description of the current business process.

Organize, and schedule review

- ✓ Send business requirements package in advance to allow all stakeholders to review it.
- ✓ Stakeholders with approval authority should be present at the session.
- ✓ Explain reviewers that the purpose of the review is remove unclear, inconsistent, and incorrect business requirements.

Roles in review

| Role | Mandatory ? | Played by | Responsibility |
|--------|-------------|--|--|
| Author | Yes | Author of requirements document, typically the business analyst. | Answers questions about the document, listens to suggestions, comments. Incorporates changes after the review session. |
| Scribe | No | Any project team | Documents all suggestions, |

| | | | |
|-----------|-----|--|---|
| | | member or author. | comments, issues, concerns, outstanding questions that rose during the review. |
| Moderator | Yes | Must be neutral. Often played by business analyst or tester. Ideally author or business process owners should not be moderator as they may lack objectivity. | Facilitates the working session. Keeps participants focused each section of the business requirements document as it is discussed. Verifies all participants have reviewed the document before the session begins. Ensures that all participants are participating in the review. |
| Peer | No | Another business business analysis who has experience in preparing similar business requirements documents. | Reviews business requirements document for its adherence to good business requirements documentation standards. |
| Reviewer | Yes | Any stakeholder. | Reviews business requirements document prior to the working session. Presents questions, comments, suggests changes, and discusses them with the group. |

Conduct review

Structure of review sessions:

- ✓ Introduce participants.
- ✓ State purpose of the deliverable to be reviewed.
- ✓ State review objectives.
- ✓ Explain project background, if required.
- ✓ Formal walkthrough/review of deliverable.
- ✓ Agree on actions/changes required.
- ✓ Determine reviewed deliverable status (e.g. signed- off, not signed off, etc.).

Compile notes, and results of the review

- Record all participant comments.
- Consider them for revisions to the business requirements document.
- At the end of the review, agree whether:
 - ✓ There are quality improvements that can be made to the business requirements document.
 - ✓ Business requirements document is acceptable in its current form.
 - ✓ Additional reviewers are required to comment on or approve the business requirements document.

Re-review, if necessary.

Rules to be followed during the review:

Moderator is responsible for making sure that all participants adhere to the rules.

- ✓ Determine appropriate project stakeholders to participate in the review/ structured walkthrough.

- ✓ Reviewers must review, and comment on the content, not on the author
- ✓ Supervisors or managers (especially of the author) should exercise caution if they attend the review. Their organizational authority, specifically with regards to other review participants, can adversely affect the level of candor during the review. There may also be a temptation to exert their authority regarding decision points in an inappropriate manner.
- ✓ Participants must review the document before the session.
- ✓ List of questions, comments, concerns, and suggestions must be compiled.

Advantages

- ✓ Promotes discussion among stakeholders.
- ✓ Effective at identifying possible ambiguities, and areas of misunderstanding.

Disadvantages

- Can lead to repeated revisions if changes are not carefully managed.
- Length of the revision, and review cycle can result in a lengthy approval process.

98. Surveys and questionnaires

A survey, also known as questionnaire, can elicit information from many people, sometimes anonymously, in a relatively short period of time. It can collect information about customers, products, work practices, and attitudes. A survey administers a set of written questions to stakeholders, and SMEs. Alternatively, respondents are provided with a series of statements, and asked for their level of agreement. Responses are analyzed, and distributed to appropriate parties.

Survey questions are of two types:

- ✓ **Closed** – Respondents select from available responses. This is useful when the range of user's responses is fairly well understood, and strength of each response category needs to be determined. Responses to closed questions are easier to analyze than open-ended questions as they can be tied to numerical coefficients.
- ✓ **Open-ended** – Respondents are free to answer the questions as they wish. Useful when the issues are known but the range of user responses to them is not known. Responses to open-ended questions may provide more detail, and a wider range of responses than from closed- ended questions. However, open-ended questions are more difficult to quantify, and summarize as they often include qualitative than quantitative language.

Steps for Survey

Prepare for survey to ensure that the needed information is obtained while minimizing respondent's time to complete it.

1. Define purpose, and objective of survey.
2. Identify target groups to be surveyed.
3. Choose appropriate survey types.
4. Confirm with sponsor.
5. Select sample group.

Distribute survey

1. Select distribution, and collection methods - For each sample group, determine appropriate communication mode, such as hardcopy mail, email or web.
2. Determine acceptable response rate. If actual response rate is lower than the acceptable threshold, use of the survey results may be limited. Offer an incentive to raise the response rate but justify, and budget the cost of the incentive.
3. Determine if the survey should be supported with individual interviews as surveys do not provide the depth of data that can be obtained from individual interviews.
4. Consider pre-survey interviews with key individuals to design survey questions,
5. Post-survey interviews can target specific survey responses or themes to elicit a greater level of detail.
6. Develop survey questions.
7. Communicate purpose of the survey. This may improve the

response rate.

8. Be aware of the group's characteristics.
 - ✓ Use information about the background of the target group, including their environment, and specific terminology to develop questions.
 - ✓ If the target group is significantly diverse, divide the group into smaller, and homogeneous groups during preparation stage, and then produce variations of the survey that fit each subgroup's background.
9. Focus on requirements - All questions must be directed towards the stated objectives.
10. Make the survey easy, and fast to complete, ideally not more than 5 or 10 minutes.
11. Arrange questions in an order which tells a story. 12. Ensure question wordings are clear, and concise, using terminologies familiar to respondents.
13. Each question must address a single point.
14. Avoid the following:
 - ✓ Double questions in a single question.
 - ✓ Negative phrasing.
 - ✓ Complex branching structures.
 - ✓ Uncomfortable questions
 - ✓ Information restricted by regulations.
15. Perform usability test on the survey. Use results to fine-tune the survey.
16. Select distribution means according to:
 - ✓ Organizational policies,
 - ✓ Urgency of obtaining the results,
 - ✓ Level of security required, and

- ✓ Geographic distribution of the respondents.

Analyze survey results

1. Collate responses. For 'open-ended' questions, identify emerging themes.
2. Analyze, and summarize results.
3. Report findings to sponsor.

Advantages

- ✓ Closed-ended surveys are effective at obtaining quantitative data for use in statistical analysis.
- ✓ Open-ended surveys can get insights, and opinions not easily obtained through other techniques.
- ✓ Does not require significant time from stakeholders.
- ✓ Effective, and efficient when stakeholders are not located in one location.
- ✓ Can result in good number of responses.
- ✓ Quick, and relatively inexpensive.

Disadvantages

- ✓ Open-ended surveys require more analysis.
- ✓ For unbiased results, skills in statistical sampling methods may be needed.
- ✓ Questions may not be answered or answered incorrectly due to their ambiguity.
- ✓ May require follow up questions or more surveys.
- ✓ Not suited for collecting information on actual behavior
- ✓ Response rates can be too low for any statistical significance.

99. System archaeology

System archaeology extracts requirements from existing or competing system documentation or implementation (code).

Advantages

- ✓ Need not start from scratch,
- ✓ Helpful when stakeholders are not available,
- ✓ System archaeology is the **ONLY** technique that can ensure that all functionalities of the existing system will be implemented in the new system,
- ✓ Helpful when explicit knowledge about the system logic has been partially or entirely lost,
- ✓ Ensures none of the functionalities of the existing system will be overlooked.

Disadvantage

- Leads to a large amount of very detailed requirements,
- Involves great effort,
- When existing or competing system and the new system differ in functionality, additional elicitation techniques, e.g., creativity techniques will be needed.

100. System interface table

A system interface table captures detailed requirements for a system interface. This typically includes attributes such as source system, source system table, source system attribute, target system, target system table, target system attribute, any transformation rules, and security rules etc.

| Destination : GRCPerfect | | Source system : Oracle Apps | | Transformation |
|--------------------------|--------------------|-----------------------------|---|---|
| Entity Name | Attribute Name | Entity Name | Attribute Name | |
| HR | Name | EmployeeMaster | EmployeeFirstName EmployeeMiddleName EmployeeLastName | Concatenate First Name, Middle Name and Last Name |
| HR | Role | EmployeeMaster | EmployeeRole | |
| HR | JoiningDate | EmployeeMaster | EmployeeJoiningDate | |
| HR | Status | EmployeeMaster | EmployeeStatus | |
| HR | ReportingManager | EmployeeAllocations | EmployeeManager | Pick the latest record |
| HR | BloodGroup | EmployeeDetails | EmployeeBloodGroup | |
| HR | Passport | EmployeeDetails | EmployeePassport | Pick the latest record |
| HR | PassportExpiryDate | EmployeeDetails | EmployeePassportExpiryDate | Pick the latest record |

Advantages

- ✓ Specifies details for each interface between the systems in the solution.
- ✓ Ensure that details about the interface are not forgotten.
- ✓ Are at lowest level of detail.

Disadvantages

- None.

101. Time boxing

Time-boxing is a prioritization technique. This is used when the project has a fixed non-negotiable timeline.

Time-boxing technique prioritizes requirements by assessing amount of work that the project team can deliver during the prescribed period of time.

Project team determines scope based on what work can be completed within the fixed window of time. Time-boxing is often used with other prioritization techniques, such as MoSCoW. This ensures that the requirements time-boxed into the release are those which business has selected as the highest priority or value.

A variation of time boxing technique uses budget instead of time to determine requirements that can be delivered based on a given budget.

Advantages

- ✓ Ensures project team is capable of delivering the scope.

Dis-advantages

- May cause user dissatisfaction as some features may not be implemented.

102. Usability analysis

Usability analysis focuses on improving usability of the applications. General principles of usability are:

1. Minimize amount of information recoding by users (Write Once, Read Anywhere).
2. Consistent dialogs across various UIs, following a user interface standard.
3. Minimizes user memory load.
4. Intuitive navigation structure. Provide guidance on likely next tasks.
5. Provide users feedback and error correction abilities instantly
6. Allow customization of the interface to determine the requirements for individualization.

Advantages

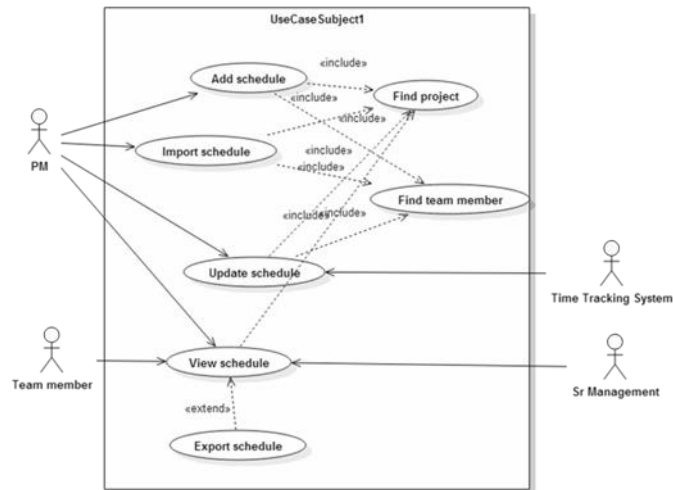
- ✓ Better application usability and acceptance.

Disadvantages

- ✓ None.

103. Use case diagram

Use case diagrams show features of a system and actors who use those features. Uses cases are depicted using oval shapes which contain name of use case. For example, here the use cases are, "Set-up project", "Assign resources" and "Track progress".



Actors

Actors are outside system boundary and represent people or systems that interact with the system. If actor is a person, a stick figure is used. If actor is a system, either a rectangle or a stick like figure is used.

System boundaries

System boundaries, represented by rectangles, separate aspects within the system (Functions) to aspects out-side the system (people or systems).

Associations

Relationships between actors, and use cases are called associations. Associations do not represent input, output, time or dependency. An association only indicates that an actor has privilege to the functionality represented by the use case.

Relationships between use cases are known as stereotypes.

There are two commonly used stereotypes:

Extend: Allows insertion of additional behavior into a use

case. The use case that is being extended must be completely functional in its own right. The extending use case does not need to be complete without reference to the base use case. An extension is functionally identical to an alternate flow, but is captured in a separate use case for convenience.

Include

Allows for the base use case to make use of functionality present in another use case. The included use case does not need to be a complete use case in its own right, if it is not directly triggered by an actor. This relationship is most often used when some shared functionality is required by several use cases.

Extend:

Allows insertion of additional behavior into a use case. The use case that is being extended must be completely functional in its own right. The extending use case does not need to be complete without reference to the base use case. An extension is functionally identical to an alternate flow, but is captured in a separate use case for convenience.

Generalization

UML provides a generalization relation between use cases or actors. In this case, specializing use cases or actors inherit properties of generalizing use case or actor. For example, actors "Program Manager" and "Project Manager"

can be generalized as actor "Employee". Generalizing actor would carry all aspects that actors "Program Manager" and "Project Manager" have in common (e.g., employee ID).

Advantages

- ✓ Very simple diagram to understand system context and functionalities
- ✓ Understand interrelationships between use cases
- ✓ Assists in identifying re-usable requirements through include use cases.

Disadvantages

- Are high level diagrams,
- Do not provide insights into how the functionalities actually work,
- Need help of other models such as activity diagram to understand detailed process flows.

104. Use case specifications

Use case specifications describe how actors interact with a solution to accomplish one or more of that actor's goals, or to respond to an event.

Although the terms scenario, and use case are often used loosely, a scenario is generally understood to describe just one way that an actor can accomplish a particular goal, while a use case describes all the possible outcomes of an attempt to accomplish a particular goal that the solution will support.

Scenarios are written as a series of steps performed by actors or by the solution that enable an actor to achieve a goal. A use case describes several scenarios in the form of primary, and alternate flows.

Primary or basic flow represents the simplest way to accomplish the goal of the use case.

Special circumstances, and exceptions that result in a failure to complete the goal of the use case are documented in alternate flows.

Some literatures on use case distinguish between alternate flow, and exception flow. Alternate flows are situations where application can complete the use case in a different path. For example, in a bank transaction, the ATM machine asking the user to change the amount based on account balance. Exception flows are ones where the application fails to achieve goal, say for example, the ATM fails to connect to the bank server.

Each scenario or use case must have a unique name within the project.

Use case name should describe which goal or event it deals with, and generally includes a verb (describing the action taken by the actor), and a noun (describing what is being done or the target of the action).

Caution: A temporal event is rarely modelled as an actor initiating a use case. The most common use of a temporal event as an actor is the use of a "Time" actor to trigger a use case to be executed based on calendar date (such as an end-of-month or end-of-year reconciliation of a system). Some authors recommend against this use.

A precondition is any fact that the solution can assume to be true when the use case begins. This may include textual statements, such as "User must be logged in" or "Item must exist in catalogue", for the successful completion of other use cases.

Flow of events describes what the actor, and the system do during the execution of the scenario or use case. Most use case descriptions will further break this down into a basic or primary flow, and a number of alternate flows that show more complex logic or error handling.

If a circumstance still allows the actor to successfully achieve the goal of the use case, it is defined as an alternative flow. If the circumstance does not allow the actor to achieve their goal, the use case is considered unsuccessful, and is terminated. This is defined as an exception flow.

Post conditions describe any fact to be true when the use case is complete which can be different for successful, and unsuccessful executions of the use case.

Sample use case:

| USE CASE #01 | Login to GRCPPerfect |
|---------------------------|--|
| Goal | Allow users who have legitimate user profile ID and password to use restricted functionalities within GRCPPerfect system and to restrict users whom are not authorized to go into system |
| Preconditions | 1. User has legitimate GRCPPerfect user login profile ID and password |
| Success End Conditions | 1. System redirect user to user home page with main menu |
| Failed End Conditions | 1. System redirect user back to login page with appropriate error message |
| Primary, Secondary Actors | 1. GRCPPerfect Users (not login yet) |
| Triggers | 1. User clicks on Login button |
| Step | Action |
| 1 | User visit URL of login page of GRCPPerfect |
| 2 | System display login page of GRCPPerfect |
| 3 | User input user profile ID and password and submit |
| 4 | System validate input, accept and record user login |
| 5 | System redirect user to home page with main menu |
| Step | Branching Action |
| 4.a | If user input is incomplete, System prompt user with alert message |

| | |
|-------------------|---|
| 4.b | If password (case-sensitive) is incorrect, System record failure attempt and redirect user to login page with error message |
| 4.b 1 | If over failure attempt limit, System lock profile and redirect user to forget password page |
| 4.c | If user profile is not valid, System redirect user to login page with error message |
| 4.d | If user profile is expired, System redirect user to login page with error message |
| 4.e | If user profile is locked, System redirect user to login page with error message |
| 4.f | If over login session limit, System redirect user to login page with error message |
| 5.a | If user is required to change password, System redirect user to change password page |
| 5.b | If user is required to update profile, System redirect user to update profile page |
| Related Use Cases | List any other use cases that are included ("called") by this use case. Common functionality that appears in multiple use cases can be split out into a separate use case that is included by ones that need that common functionality. |
| Business rules | Follow corporate password policy for passwords. |
| Priority | Highest - Most of business-critical functionalities are dependent on this Use |

| | |
|--|--|
| | Case |
| Non-functional requirements (Performance, Security, Usability etc.) | System shall response to User within 5 seconds regardless of login acceptance, failure or redirection to other pages |
| Frequency | Per Entity (country) - Estimated 1 request for this Use Case every 5 minutes |
| Assumptions | 1. User has a broadband access or relatively fast connection to Internet |
| | 2. User Internet browser is a supported version and can support JavaScript |

Advantages

- ✓ Detailed and provide insights into how the functionalities actually work.

Disadvantages

- Have large amount of texts,
- Process steps possibly can be better described in activity diagrams.

105. User stories

User Stories are a brief textual description, typically 1 or 2 sentences, of functionality that users need from a solution to meet a business objective. User story described who uses the story, the goal they are trying to accomplish, and any additional information that may be critical to understanding the scope of the story.

The only detail that needs to be included is information that reduces the risk of misunderstanding by developers that create the estimate. A user story includes:

- ✓ User (Actor) - Stakeholder who benefits from the user story.
- ✓ Description - A high-level overview of the functionality.
- ✓ Benefit - Business value that the story delivers.
- ✓ Defined acceptance, and evaluation criteria.

Advantages

- ✓ User stories create an environment of customer ownership of features, and prioritizations in an incremental, iterative development environment.
- ✓ May eliminate the need to provide functional requirements in some environments.
- ✓ User stories require that the value delivered by the story be clearly articulated

Disadvantages

- May not be the best technique for environments with regulatory restrictions or when an organization

mandates documentation.

- May not be effective when participants are not co-located.
- Does not explicitly address non-functional requirements.

106. **Version control system (VCS)**

Version control systems (VCS) track changes to documents and code. VCS systems are part of configuration management systems (CMS).

VCS can be achieved through simple mechanisms such as using the document's file name to reflect date, time, and version number. It also can be more formal by a VCS technique which provides facilities of checking out and locking documents during editing, checking in with comments explaining the changes made, and versioning automatically.

Business analysis plan should mention if any VCS is planned for the project.

Advantages

1. Maintain history of requirements changes.

Dis-advantages

2. Requires additional investment and training.

107. **Walk-through, aka lightweight review**

Walk-throughs are less strict than inspections and roles are less differentiated. During a walk-through, at least roles of reviewer, author and minute-taker and potentially moderator, are staffed.

During walk-throughs, participants validate requirements in a step-by-step manner under guidance of moderators. Authors of requirements introduce requirements and may provide additional information along with actual requirements (e.g., alternative requirements, decisions and rationale for decisions). Minute-takers document identified requirements defects.

Advantages

- ✓ Simple to conduct.

Disadvantages

- ✓ Less effective than inspections.

108. Weiger's matrix (Weighted average index)

Wiegers prioritization matrix is an analytical prioritization approach for requirements. Calculation method is as follows:

| | |
|---|---|
| 1 | Determine relative weights for benefit, detriment, cost and risk. |
| 2 | Determine requirements to be prioritized. |
| 3 | Estimate relative benefit. |
| 4 | Estimate relative detriment. |
| 5 | Calculate total values and percentage values for each requirement: $\text{Value\%}(R_i) = \text{Benefit}(R_i) \times \text{Weight Benefit} + \text{Detriment}(R_i) \times \text{Weight Detriment}$ |
| 6 | Estimate relative cost and calculate cost percentage for each requirement. |
| 7 | Estimate relative risks and calculate risk percentage for each requirement. |
| 8 | Calculate individual requirement priorities: $\text{Priority}(R_i) = \text{Value\%}(R_i) / (\text{Cost\%}(R_i) \times \text{Weight Cost} + \text{Risk\%}(R_i) \times \text{Weight Risk})$ |
| 9 | Assert rank of individual requirements. |

Advantages

- ✓ Comprehensive mathematical approach.

Disadvantages

- ✓ Takes time.

